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THE
VICTORIAN NATURALIST

THE JOURNAL AND MAGAZINE

OF THE

Field Naturalists' Club of Victoria

VOL. XLII

MAY, 1925, TO APRIL, 1926

Hon. Editor: **CHARLES BARRETT**

The Author of each Article is responsible for the facts and
opinions recorded

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THE VICTORIAN NATURALIST

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ERRATA:

- Page 32, line 4 from bottom—"December, 1902" should read December, 1892.
- Page 184, line 19—For "another point," read anther point.
- Page 200, line 6—For *Considerniana* read *Consideniana*.
- Page 214, line 11 from bottom—For "englyphoides" read *cuglyphoides*.
- Page 238, line 18 from bottom—For "chat" read chert.
- Page 257, line 18 —For *Ricinus* read *Ricinocarpus*.
- Page 257, line 15—For *Hakeus* read *Hakeas*.
- Page 259, line 20—For *Culex* read *Pulex*.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING. MONDAY EVENING, 11th MAY, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—

Miss Webb,
Flat 12, "Arundel,"
Commercial Rd.,
South Yarra.

PROPOSER.

Miss Forsyth.

SECONDER.

Mr. C. Oke.

Mr. A. F. Archer,
Head Master,
Caulfield Grammar School.

Mr. C. Daley.

Mr. A. E. Keep.

3. Nominations for Membership.

4. General Business.

Election of Two Auditors.

Nomination of Office-bearers, 1924-5.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Paper and Discussion thereon.

By Mr. C. Daley, B.A., F.L.S.—"A Visit to the Upper Murray."

The Committee will be pleased to receive promises of papers for future meetings.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Club year ended with last month. Any subscription overdue should be forwarded to the Hon. Treasurer at once.

Subscriptions for the year 1925-26, at the new rate, became due on May 1:—Ordinary Members, 20/-; Country Members, 12/6.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

The Victorian Naturalist

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MAY 6, 1925.

No. 497

FIELD NATURALISTS' CLUB OF VICTORIA.

The monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, April 20, 1925.

The President, Mr. J. Searle, occupied the chair, and about fifty members and friends were present.

CORRESPONDENCE.

From Hon. Secretary Australian Forests League, inviting this Club to join with the League in forming a deputation to the Minister of Lands to protest against the proposed alienation of lands in the Otway Forests area. It was proposed by Mr. F. G. A. Barnard, seconded by Dr. C. S. Sutton, "That the Club be represented on the deputation." Carried.

Messrs. C. Daley and F. G. A. Barnard were appointed to represent the Club.

REPORT OF EXCURSION.

A report of the excursion to Broadmeadows on April 18 was given by the leader, Mr. J. Wilson. He said that a party of members had walked to Gellibrand's Hill, over a circuitous route, noting interesting geological features. From the hill beautiful views of the surrounding country were obtained.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. W. H. Callister, 52 Alexandra Avenue, Canterbury, and Mr. and Mrs. Dwyer, 38 Brougham Street, Box Hill, were unanimously elected as ordinary members of the Club.

GENERAL BUSINESS.

Mr. C. Oke moved that the congratulations of the Club be conveyed to Mr. P. C. Morrison on his obtaining the degree of Master of Science in Zoology. Seconded by Mr. F. G. A. Barnard and carried.

Dr. Sutton mentioned that the Tree Lovers' League needed more members, and he asked the Club's help in gaining them.

PAPER.

By Mr. P. F. Morris: "The Need for Growing Softwoods for Paper-making." The author referred to the heavy importations of paper, and expressed the opinion that such paper should be manufactured in Australia. Experiments, he considered, should be conducted with native trees that were of little use as timber, to ascertain their value for pulping. Large areas might be planted with trees suitable for the production of paper pulp. The paper caused some discussion, in which Dr. Sutton and Messrs. F. Pitcher, F. G. A. Barnard, C. Oke and H. B. Williamson took part.

EXHIBITS.

By Mr. F. G. A. Barnard—Rocks from Derrinal, some striated.

By Miss E. C. Cameron—Brittle starfishes, belonging to the family *Ophuridae*, from Cowes, Phillip Island, Vic.

By Mr. C. Daley, B.A.—Samples of native timbers from Gippsland; also *Gaultheria hispida*, Waxberry, from Mt. Magnet, Tasmania.

By Mr. A. E. Rodda—Decomposed granite, from Gellibrand's Hill, collected on Broadmeadows excursion.

EXCURSION TO BALWYN.

Rain did not deter about a dozen members from meeting at Mont Albert Station on March 31; but it was decided to curtail the programme and visit only the newly-acquired reserve on the White Horse Road. On our way, via Mont Albert Road, to Maling's quarry, some of the features of the surrounding geography were pointed out, while Mr. P. R. H. St. John explained the reason for the presence of the many fine gum trees and pines of the district.

The quarry is of extraordinary interest, being situated on a fold, or anticline, which runs through to Templestowe and beyond. The folding was so intense at this spot that the rocks of mudstone (Silurian) were crushed and sheared so that secondary (metasomatic) changes took place, and numerous crystals of pyrites were formed. The pyrites (iron bisulphide) was subsequently dissolved out, leaving its cubical moulds scattered through the hard mudstone. In one place a large stack of the altered rock, standing out at the side of the pool, shows how the seamed rock, filled with

quartz veins, was squeezed and fractured almost to the extent of mylonisation. This broken and fissured rock would make an excellent subsoil for the planting of shrubs and trees, as proposed. This interesting geological site of one and a half acres has been generously given to Camberwell by Mrs. K. Maling. The mayor, Councillor A. E. Hocking, was prevented, by another engagement, from visiting the quarry on this occasion. He has already expressed his appreciation, and that of the Camberwell Council, of the Club's proposed effort to plant this reserve, when the ground has been prepared and the fencing completed. As the rain continued, the members adjourned to the leader's house, where, by means of microscope, specimens and books, much interesting discussion was elicited.—F. CHAPMAN.

PLANS FOR THE "NATURALIST."

With the authority of the Committee, I propose to make some changes in our journal—changes that depend for their success upon the co-operation of members with the Editor. Notes from the field and the study are desired, to fill several pages of each issue. Country members, especially, are invited to contribute from their stores of natural history knowledge.

Record your observations for the benefit of others. A paragraph may be made as interesting as a paper. Specialists could give us glimpses of their subjects—not general summaries, but notes that are "news" to the majority of nature lovers.

Hints for the novice, from veteran students and collectors, will be acceptable—brief paragraphs of the kind that helped to make "Science Gossip" popular. Indeed we might, with advantage, adopt other features of that delightful journal, whose passing was so keenly regretted. But a dozen more pages at least would be needed, and the present high cost of printing prohibits such enlargement of the "Naturalist."

If funds permit, our journal will be more freely illustrated. The aim is general improvement, though we are not so rich as we could wish, and perforce must hasten slowly towards the goal.

Space for nature notes will be gained by condensing reports of Club excursions. There rarely is a good reason for making the report of an afternoon outing, or even a whole-day one, lengthy, at least for publication. As a journalist one learns the value of "selection."

“The Victorian Naturalist,” under Mr. Barnard’s care, has not only become one of the leading publications of its class in the Commonwealth; it compares favourably with field club journals issued overseas. Yet there is room for improvement, and the plans outlined here are the fruit of a general discussion in committee. I shall be on trial as Editor during the next twelve months, and criticism will not be unwelcome.—CHARLES BARRETT.

SPARROW-HAWKS AT HOME.

BY W. C. TONGE.

The home life of the Sparrow-hawk, *Accipiter cirrocephalus*, is not so well known as that of many other birds of prey. Last season (1924) I was able to keep a nest and its owners under observation, from “building-days” until the brood had ranged. The nest-tree—a Eucalypt—grows in a gully at Eltham Heights, close to my own paddock. The Sparrow-hawks built on a bough about 40 feet from the ground. The nest resembled that of a Magpie, but the egg-cavity was shallow, with a lining of green gum leaves.

On October 14 I climbed to the nest, and found in it three fresh eggs. On October 22, when the male Sparrow-hawk had been brooding for about two days, the nest contained four eggs. Two eggs hatched on November 19, another three days later; the fourth egg was infertile. The nestlings were covered in creamy down. Portions of the breast and head of a small bird, denuded of feathers, were lying in the nest on the day when I first saw the “twins,” one of which was pecking at the food.

When the young birds were nearly fledged, about the middle of December, I climbed the tree to take a photograph. A nestling fluttered away, or was knocked off the nest by one of the parent birds. I replaced it; but the female hawk tried repeatedly to knock one or other of the youngsters off the nest with her wing. On December 18 the nest was empty when I “called”: on the 20th, however, the brood was at home—three fine little Sparrow-hawks standing on the flattened nursery of twigs, sticks and leaves. When I saw them on December 23, brown streaks on the breast plumage were changing to bars; and, a few days afterwards, the young birds were scarcely distinguishable from their parents. They were hunting for themselves when five weeks old; on several

occasions I observed one with a bird, or portion of one, in its talons.

The parents were bold and aggressive. Disturbed at the nest, they flew around, uttering cries resembling notes of the White-plumed Honey-eater, *Meliphaga penicillata*, and others, not unlike the call of the Sacred Kingfisher, *Halcyon sanctus*. I noticed that, during the incubation period and while the brood was being reared, the female Sparrow-hawk's plumage became darker. Parents and young remained in the vicinity of the nest until the end of January; and I saw them about the paddocks often, for some weeks afterwards.

Several pairs of small birds nested in the neighbourhood of the Sparrow-hawks' home. A pair of Leaden Flycatchers, *Myiagra rubecula*, reared a brood of three almost in the shadow of the hawk-tree.

[Mr. Tonge is a keen observer, and his record of the home-life of a Sparrow-hawk family is a valuable page of bird biography. The Eltham district is fairly rich in birds. Mr. Tonge has listed more than one hundred species, and the most of them have nested at Eltham.—Editor.]

CHECK LIST OF AUSTRALIAN BIRDS.

The second edition of the Official Check List of Australian Birds, compiled by a special committee of the Royal Australasian Ornithologists' Union, will be published some time this year. Bird students will notice many changes in nomenclature. The iron law of priority has been observed meticulously, and the passing of some familiar Gouldian names must be lamented. The trivial names, too, have been under revision. Many of the changes made, doubtless, will be welcomed by bird lovers. The total number of species recognised is 703. The list is a bi-nominal one; but the host of sub-species described and named in recent years has not been ignored—all are listed as synonyms. Sub-species are the delight of many systematists; the average field naturalist is wisely conservative, and holds no brief for tri-nomials.

The new Check List will be indispensable to every student and observer of Australian birds. For many years it must remain the standard; though all the committee's "findings" may not meet with general approval. The preparation of the List has entailed much work, including study of the literature, examination of specimens in State museums and private collections, and the compilation of a full synonymy.

NEW AUSTRALIAN COLEOPTERA.

(PART I.)

BY CHARLES OKE.

(Read before the Field Naturalists' Club of Victoria,
9th March, 1925.)

SCARABIDÆ

APHODINÆ.

Aphodius dixonii sp. nov.

M. Black; under-surface diluted with red; front and lateral margins of prothorax and elytra (its markings excepted) flavous; legs reddish, in parts infuscated. With short, pale, sub-erect hairs, thick on front of head and margin of elytra, sparse elsewhere; prothorax with a conspicuous fringe of longer hairs. Head, prothorax and scutellum sub-nitid; elytra sub-opaque. Head with elevated margin, incurved to middle; base impunctate, in front and clypeus strongly and coarsely punctate. Prothorax transverse (3 x 4) irregularly punctured, a faint median line on basal third, front angles slightly produced, hind obliquely rounded. Eyes opaque, distinctly faceted. Elytra with minute punctures and very fine striæ; the odd interstices evenly elevated, the even ones wider and flat. Scutellum sparsely punctured. Anterior tibiæ bi-dentate on the external edge.

F. Similar. Prothorax with median line more strongly impressed and longer; hind angles strongly notched out. Front tibiæ tri-dentate. Length, $6\frac{1}{2}$ m.m.

Hab. Victoria: Lake Hattah (J. E. Dixon and C. Oke), in stereo.

A variable species in the markings of the elytra; some specimens having most of the elytra black, but not suture or apex. Most have about half of elytra dark. One specimen has a small black spot on middle of fourth interstice, and three small, faint infuscate spots on apical third.

Apparently nearest to *callabonnensis* (Blkb.) of the described species, but with sexual characters different. I cannot detect any difference in the puncturation of the pronotum in the **M.** and **F.** The puncturation of this part is very uneven in size and distribution in both sexes.

I have much pleasure in naming this sp. after my friend, Mr. J. E. Dixon, who has taken numerous specimens of it on several visits to the locality.

Types in author's collection.

PSELAPHIDÆ,

Sagola helenæ, sp. nov.

M. Reddish, castaneous, elytra and legs slightly paler, palpi flavous; clothed with moderately long yellow setæ, a few longer hairs intermingled, thicker on apex of elytra and on abdomen. Head small, with a deep foveate impression in front, connected with cut through anterior margin; a few large punctures, closest on antennal tubercles. Eyes large, prominent. Antennæ reaching apical third of elytra; first joint nearly as long as next three combined, second moderate, third small, fourth to eighth sub-equal, ninth and tenth slightly larger, eleventh ovate, one and a half times as long as tenth. Prothorax cordate, lightly transverse, wider than head, with sides strongly rounded and widest at middle, with a strong impression near base connecting three foveæ, of which the median one is the largest and slightly in advance of the others, and with an oblique lateral impression near base. Elytra longer than wide, each elytron with a small fovea at base of sub-sutural stria and another behind it; dorsal stria represented by two foveæ, a small one at base, and a larger one behind it; a round fovea at base between sutural and discal striæ; a row of punctures near lateral margin; a curved double row of punctures on epipleuræ. Abdomen longer than elytra, dilated to fourth segment; with a few scattered punctures; under-surface with a large round depression common to fifth and sixth segments, a small split granule at bottom. Front trochanters minutely bi-dentated. Length, 2.25 m.m.

Hab. Victoria: Evelyn in June (C. Oke).

This genus, so numerous in New Zealand, has not been recorded from the mainland of Australia. Mr. Lea has described one species from Tasmania, from which the present species differs (by description) in foveæ of the under-surface of abdomen, by the front trochanters being armed, and the hind ones not armed, and the impression on head not being continued to base.

Type in author's collection.

Sagola victoriæ, sp. nov.

Reddish castaneous, disc of elytra, legs (knees excepted) and palpi paler, clothed with long, yellowish setæ, a few longer ones intermingled. Head rather small, with two small medio-basal foveæ, and deeply impressed between antennal tubercles, ending in a foveate expansion between eyes; the latter large and prominent; sparsely punctured. Antennæ

reaching middle coxæ, first joint large, as long as next two combined, second same thickness as first, third small, fourth to sixth sub-equal, seventh to tenth trapeziform, eleventh ovate, slightly acuminate. Prothorax cordate, slightly longer than wide, widest at middle, sides strongly rounded, with a wide tri-foveate impression near basal third, the centre dilated forward; the sides with an oblique impression; a large, round foveæ at base. Elytra quadrate, with scattered rough punctures; discal striæ widely impressed to beyond middle; base with several small, indistinct foveæ. Abdomen a little dilated to fourth segment; under-surface slightly flattened. Legs apparently unarmed. Length, 2.60 m.m.

Hab. Victoria: Belgrave, Macedon, Daylesford (C. Oke).
Types in author's collection.

Sagola brevipennis, *sp.nov.*

M. Reddish castaneous, elytra lighter, tip of abdomen and palpi flavous. Head widely and deeply impressed between antennal tubercles. Antennæ shorter and thicker than in preceding species, with the joints 4-5-6 more globular, and 9-10 shorter and more transverse. Fourth joint of palpi sub-fusiform. Prothorax cordate, sides rounded, widest about middle, where width is equal to length, with a sub-basal tri-foveate impression; with very fine punctures. Elytra short, transverse. Abdomen dilated to fourth segment; under-surface with a narrow, transverse impression, on fifth and sixth segments. Length, 2.85 m.m. (Abdomen distended.)

Hab. Victoria: Belgrave (C. Oke).

Impressions on elytra as in *victoriae*, but the elytra are much shorter, the body narrower, and the antennæ shorter.

Types in author's collection.

Sagola formicicola, *sp.nov.*

M. Castaneous, legs and palpi lighter; clothed with pale and rather short fine pubescence. Head small, with a foveate impression in front, and two small medio-basal foveæ. Antennæ not quite reaching middle coxæ, first joint longer than next two combined, third small, thence gradually increasing in size to apex, ninth and tenth transverse, eleventh irregularly ovate. Prothorax with sides rounded and constricted near base, with a transverse tri-foveate impression, dilated forward in centre. Elytra lightly transverse; with a large impression at base of sutural striæ, discal striæ represented by two impressions, a small one at base and a larger one behind it. Abdomen very gently dilated to fourth segment, which is long; under-surface somewhat constricted before

apex, the apex itself slightly produced. Legs unarmed. Length, 1.20-1.30 m.m.

♂ F. Similar, but under-surface of abdomen evenly convex to apex.

Hab. Victoria: Fern Tree Gully in nest of *Amblyopone australis* (C. Oke).

Distinguished by its small size and its pale, almost ashen, and short, pubescence.

Types in author's collection.

Rybaxis sternalis, sp. nov.

♂. Dark castaneous, elytra and legs reddish castaneous, palpi flavous, clothed with short, pale pubescence. Head longer than wide, with two large round interocular foveæ, and a small one behind; in front of foveæ rather coarsely punctate, behind smooth; nitid. Antennæ long, very irregular; first joint stout, longer than next two combined, second same length as third, but stouter, fourth longer, cylindrical, fifth longer than fourth or sixth, irregularly widened on its inner edge, sixth slightly longer than fourth, cylindrical, seventh slightly shorter but wider than sixth, irregularly widened on its inner edge, eighth smallest, quadrate, ninth same length as fourth, nearly as wide as long, tenth longer than ninth, transverse, eleventh ovate, not quite as long as ninth and tenth combined, with a small appendage on lower surface. Prothorax transverse, convex, sides strongly rounded, the lateral foveæ connected by a well-defined curved impression, somewhat expanded in middle; striolate in front of impression, with a few punctures near apex and sides, behind smooth. Elytra lightly transverse, slightly attenuated to base; sutural and discal striae distinct, the latter lightly curved and diverging, deep at base and vanishing near apex; each elytron produced at middle of apex; punctures fine and indistinct. Abdomen with a small, transverse impression at base of first segment, and two striae close to sutural striae at base, but diverging and vanishing before apex of segment; under-surface with a small plate on edge of second segment, this segment produced, in centre, over apex of third segment. Metasternum deeply sulcate, on each side of sulcus with a large protuberant tubercle. Four front trochanters strongly dentated; front femora inflated and with a small tooth nearer base than apex; front tibiae sharply dentate at apical third, and somewhat excavated from there to apex; posterior tibiae lightly inflated and compressed to apex, near apex notched, and with a paral-

lel spur, invisible from most directions. Length, 2.70-2.50 m.m.

F. Differs in having shorter antennæ, and the fifth and seventh joints not widened as in the male, but showing a slight trace of it; and metasternum, abdomen and legs not armed.

Hab. Victoria: Beaconsfield, in grass; Evelyn, in moss. (C. Oke.)

In appearance very like *strigicollis*, but under-surface and legs different. In many respects close to *mirabilis*, but sternum and legs of that species, apparently, not armed. The present species has an additional fovea on head, and a single plate on abdomen, and its apex not excavate. The abdominal plate is rather narrow, lightly overhangs the third segment, and is bent back, with its free edge, which is rounded, directed cephalid.

Types in author's collection.

Narcodes crassus, sp.nov.

M. Dark reddish castaneous, much infuscated in parts. abdomen nearly black, palpi lighter; with pale subsquamose clothing, darker in patches on abdomen; densely punctate. Head transverse, with two interocular foveæ, and the front widely impressed, and continued between antennal tubercles, which are conspicuously raised; hind angles produced. Antennæ reaching beyond middle coxæ, first joint stout, longer than second and third combined, second shorter and stouter than third, third to fifth sub-equal, sixth to eighth decreasing in size, ninth longer, not quite as wide as long, tenth quadrate, eleventh ovate, not quite as long as ninth and tenth combined. Prothorax distinctly transverse, sides rather strongly rounded, with a shallow medio-basal fovea, and a foveate impression on each side. Elytra short, dilated to apex; sutural and discal striæ distinct, the latter widely impressed at base and continued to near apex. Abdomen dilated to third segment, declivious from second, with wide margins; under-surface with a large round excavation, common to second and third segments, and slightly encroaching on fourth; the ultimate segment somewhat produced and bi-impressed. Metasternum deeply sulcate, the sides of sulcus finely carinate; with a lamelliform protuberance at its base, between the hind coxæ, at right angles to the body, its lower edge concave. Front trochanters bi-dentate, all the femora are somewhat inflated, and constricted near apex, the anterior

ones with a sharp tooth near base; all the tibiæ curved, and obtusely armed at apex.

F. Similar, but metasternum only flattened in middle and abdomen convex on under-surface. Length, 3.25-3.35 m.m.

Hab. Victoria: Grampians (C. Oke). In moss.

A large, robust species, distinguished from *ectatomma* (by description) in prothorax not having flattened and armed sides, discal striae continuous to apex, and metasternum. The latter, when viewed obliquely from behind, appears to have two wedge-shaped teeth with their bases joined together, but when viewed from in front it appears to have a small plate with its outer edge gently concave. On this and the following species there is a small tubercle on the clypeus (?) overhanging the front of the head.

Narcodes vulgaris, sp. nov

M. Black, or almost so, head antennæ (club black) and pronotum dingy brown, elytra and legs (knees infuscated) reddish, palpi flavous. With golden subsquamose clothing, longer at apex of elytra and two rows down abdomen than elsewhere. Head lightly transverse, with two shallow interocular foveæ, and a deeper one in front; hind angles produced downwards into an obtuse point; with coarse, dense punctures. Antennæ passing middle coxæ, first joint stout, as long as two and three combined, second stouter and much shorter than third, third to eighth decreasing in length, ninth one-third longer than eighth and not much wider, tenth a little shorter, quadrate, eleventh ovate acuminate, as long as ninth and tenth combined. Prothorax as long as wide, a shallow medio-basal impression, and a smaller but deeper one on each of the declivous sides; front angles widely rounded off; with punctures as on head. Elytra distinctly transverse, dilated posteriorly; sutural and discal striae distinct, the latter widely impressed, and continuous; punctures much as on head. Abdomen with second and third segments dilated posteriorly, fourth parallel-sided, fifth and sixth decreasing; punctures somewhat finer than on elytra; under-surface with a large excavation, common to second, third and fourth segments, these segments also transversely impressed, the second having a fairly wide impression, the third narrower, and the fourth very narrow, the impressions smooth and nitid. Metasternum excavate and densely punctate. Front trochanters bi-dentate, teeth equal; all the femora somewhat inflated and constricted near apex, front femora with a short, sharp tooth at base; four

front tibiae curved, and obtusely spurred at apex, hind tibiae less curved and unarmed. Length, 2.6-2.5 m.m.

f. Differs in having antennae slightly shorter, metasternum not so excavate, and abdomen slightly convex on under-surface.

Hab. Victoria: Ringwood, Pakenham, Killara, Warburton, Evelyn (C. Oke); Fern Tree Gully (J. E. Dixon and C. Oke). Mitcham (E. Nye).

A common species in grass tussocks. Close to description of *nigriventris*, Lea, but intermediate trochanters not armed, and under-surface of abdomen deeply excavated.

Tmesiphorus camponoti sp. nov.

m. Dark castaneous, elytra and legs lighter, clothed with short, depressed golden pubescence; a fascicle of hairs on each side of under-surface of head behind each eye. Head with two moderate interocular foveae, front longitudinally impressed between antennary ridges; densely punctate all over. Antennae reaching middle coxae, robust, first joint stout, as long as next two combined, second stouter but same length as third, third to fifth sub-equal, sixth to eighth smaller sub-equal, ninth as long as two preceding, sub-quadrate, tenth slightly shorter but wider than ninth, eleventh irregularly ovate, one and a half times as long as ninth. Prothorax a little longer than wide, widest at apical third, sides rounded; with a shallow round medio-basal fovea, and a deeper one on each side; punctures as on head. Elytra wider at apex than length, moderately narrowed at base, sutural striae fairly distinct, discal striae widely impressed at base, vanishing at apical fourth, shoulders somewhat raised; punctures a little finer than on head. Abdomen a little longer than, but same width as, elytra, punctures as on elytra; under-surface slightly flattened, apex produced a little. Legs long; four anterior tibiae curved, hind almost straight.

f. Differs in having joints nine and ten of antennae same length, and under-surface of abdomen less flattened, and apex not produced. Length, 2.36-2.92 m.m.

Hab. Victoria: Lake Hattah (C. Oke), in nest of *Camponotis nigriceps*.

Belonging to the division of the genus not having a spine behind the eye. Close to *curvipes*, Lea, but no basal impression on head, antennae not reaching hind coxae, prothoracic fovea different, and no impression on under-surface. The base of the abdominal segments only are flattened, the apex of each being normal.

Types in author's collection.

Chalcoplectini, tribus nov.

Body long, depressed. Mouth parts well developed. Maxillary palpi normal, of four joints. Intermediate coxæ sub-globular approximate, posterior triangular, distant. Anterior and intermediate trochanters long; posterior short. Tarsi with first joint rather short, second large and dilated, third longest, and inserted on the base of the second. Two well-developed claws. Other characters as in the single genus, *Chalcoplectus*.

The insect for which this tribe and genus are proposed shows a rather peculiar combination of characters. The shape of the body, and, to a certain extent, the mouth parts, are suggestive of the *Faronini*, and its tarsal joints are somewhat as in the anterior tarsi of *Exeirarthra*, Broun, from New Zealand, but are the same on all legs. The antennæ, intermediate trochanters, and the inner claw of anterior tarsi being trifid, are very much as in *Palimbolus* (*Tyrini*), but the tarsal joints and body, *inter alia*, would exclude it from the *Tyrini*.

The intermediate trochanters are only comparatively long; that is to say, they are longer than those found in genera known to me, belonging to the *Brachyscelides*, and have been compared with the following genera:—*Sagola*, *Euplectops*, *Macroplectus*, *Plectostenus*, *Mesoplatus*, *Batrisodes*, *Batraxis*, *Briara* and *Rybaxis*. They are not as long as the corresponding parts in *Pselaphus*, *Pselaphophus*, *Tyraphus* and *Oteniosophus*, but are as long as in *Narcodes*, and some of the genera of the *Tyrini*. According to M. Raffray's classification of the family, this tribe would follow *Tyrini*, before the *Schistodaetylini*, as it is obviously a stage before the bilobing of the second tarsal joint.

Chalcoplectus, gen. nov.

Body long, depressed. Head sub-quadrate. Eyes large, coarsely fascetted, prominent, situated a little behind the middle. Antennæ eleven-jointed, first joint large, club three jointed, bases distant. Labrum broad and transverse, its edge ciliated. Mandibles with basal portion thick, the apical portion abruptly curved inwards, elongate and acuminate; inner edge denticulate. Mentum large, not transverse. Maxillæ well-developed, with the lobes distinct; the cardo somewhat triangular, and finely carinated on its external edge; its palpi large, four-jointed, first short, strongly curved; second long, thin at base, clavate at apex, bent outwards; third joint shorter than second, slightly longer than fourth, a short

peduncle and strongly clavate, the latter not quite as broad as the second; fourth joint ovate, with a very short peduncle, apex with a minute membranous appendage. Prothorax cordate, tri-foveate. Elytra short, with discal stria. Abdomen long of six segments in *m.* and seven in *f.*; first short, invisible, second and third large, sub-equal, fourth largest of all; strongly margined. Mesosternum short; metasternum long. Legs rather long. Anterior coxæ conical, prominent, contiguous; intermediate globular, almost level, approximate; posterior triangular, widely separated. Anterior trochanters decidedly long; intermediate long, posterior short. The femora lightly inflated, and obliquely inserted on the trochanters. Tarsi with first joint rather short, second longer and dilated, with the third inserted on its base. Anterior tarsi with inner claw trifid in the *m.*, slightly thicker than outer in *f.*; other tarsi with two well-developed equal claws.

Chalcoplectus depressus, sp. nov.

m. Castaneous, elytra and legs paler, palpi flavous; sub-nitid; with long, pale pubescens. Head very lightly transverse, with rather coarse reticulate punctures; widely hollowed between antennal tubercles, and continued back to level of front margin of eye, where there is a round fovea, and with two interocular foveæ. Mandibles tri-denticulate. Antennæ long; first long and stout, as long as next three combined, second a little longer and broader than third, fourth to eighth sub-equal, ninth large, sub-quadrate, tenth larger, lightly transverse, eleventh ovate, as long as nine and ten combined. Prothorax about as long as the width at its widest, which is at apical third, in front suddenly narrowed to apex, and irregularly narrowed to base; a round discal fovea at basal third, and an oblique foveate impression on either side; punctures as on head. Elytra transverse (as 4 to 5), attenuated to base; each elytron with distinct sub-sutural stria with a round fovea before base; distal stria widely and obliquely impressed with a fovea at base; punctures fine and indistinct. Abdomen long, three first (visible) segments widely margined; with a short simple carinule on either side of basal segment, rather near the margin, punctures much as on elytra. Metasternum lightly impressed and excavated posteriorly, sparsely punctured. Under-surface of abdomen with a few large punctures, and fifth segment transversely impressed. Intermediate trochanters with a triangular tooth, posterior trochanters with a

strong, rounded tooth. Femora inflated in middle, tibiae somewhat curved. Length, 2.75-2.85 m.m.

r. Differs in not having abdomen impressed, and trochanters not armed.

Hab. Victoria: Belgrave, Evelyn, Bacchus Marsh, Coburg (C. Oke), Fern Tree Gully (J. E. Dixon and C. Oke), Mitcham (Rev. E. Nye), Mooroolbark (E. Fischer). Found at base of grass tussocks.

The insect, when alive, is rather suggestive of a Staphylinid, more especially in the manner in which it runs.

CUCUJIDÆ.

Cryptomorpha lata, sp. nov.

Dark piceous brown, tarsi paler, clothed with moderately long, erect hairs. Head transverse, excluding mouth-parts, with large rugose and confluent punctures; eyes prominent. Antennæ reaching hind coxæ, first joint long and stout, longer than next two combined, second small, third a little longer, fourth to eleventh long sub-equal, eleventh acuminate. Prothorax as wide as long, convex, with the front angles produced, the produced part rounded; with a feebly-raised median ridge. Elytra with the striæ coarsely crenulate-punctate, and the interstices finely punctured. Femora moderately inflated. Length, 5 m.m.; width, 2 m.m.

Hab. Victoria: Bendigo, Gypsum (C. Oke), Inglewood (J. E. Dixon and C. Oke), Kiata (F. E. Wilson), Maldon (J. C. Goudie).

A broad, distinct species, wider than any of the described ones. Most of the specimens are of a dull red-brown about the base of thorax and base of elytra, others being darker there. The Kiata specimen is more or less of this colour all over.

NOTES ON BEETLE LARVÆ.

BY C. OKE.

How little is known regarding the habits of our beetles! Approximately, 15,000 species have been described from Australia, and the complete life history of none has been published yet.

It is known where many of the Buprestids, Longicorns and Chafers breed. The larvæ of water-beetles are easily obtained, and it should not be difficult to rear some species. A few of the Weevils breed in certain foodstuffs, but their life-histories have not been worked out in detail. Carab

larvæ are familiar—as Carab larvæ; but who can identify one with certainty? Staphylinid larvæ are not often seen, and “in captivity” they soon die.

There are numbers of species—even whole groups—that are quite unknown as larvæ and pupæ; for instance, the large Weevils belonging to the *Amycterina*, a sub-family confined to Australia, with a considerable number of species. We do not know where they breed. Again, the family *Pselaphida* has more than 400 described Australian species, and the larva of none has been found.

Unfortunately, beetles are, as a rule, difficult to breed out; they require conditions not easily supplied, and time and patience must be devoted to them. My attempts often have proved futile. I collected two Chafer grubs, about an inch in length, and thought to rear them without trouble. The larvæ of these Chafers live in damp soil, and eat grass-roots. I kept my specimens in a tin of damp earth, and provided fresh clumps of grass at regular intervals. More than two years elapsed before one larva pupated; the other had died. Beetles do not, usually, live long as pupæ; but soon “turn” or emerge from the pupal skin, though the emergence is gradual. The colours of maturity, and “hardness,” are not attained for some time—several months in some cases.

My Chafer grub, which had survived, half-emerged from the pupal skin, assumed a light-brown colour, and then died. It was a *Dasygnathus*, and, had it lived, would have been almost black. At the present time (May, 1925) I am feeding a large Click-beetle larva on termites, which appear to be its natural food. I obtained this specimen in the Mallee last November, and think it will prove to be *Tetrolobus fornumi*. I may be wrong as to the species, but am sure of the genus, as I have bred another species, *murrayi*. It is only after rearing, or trying to rear, a few beetle larvæ, that one realises how many are killed by parasites. When a grub has been kept for some months it is annoying to find a parasite in the breeding-box.

I am unable to give definite accounts of the breeding habits of the beetles described in preceding paper. The life histories of the *Pselaphida*, to which family most of my species belong, are still “ungarnered grain.” As beetles, those described live in mosses and grass-tussocks. Other species live among rotting leaves, under bark, or clinging to logs and stones; while a fair number of species are found only in

ants' nests. In fact, they are generally regarded as ants'-nest beetles; but of the 160 species I have collected in Victoria, fewer than 40 were found in association with ants; while only one was among termites.

The species of *Aphodius* live in dung, and burrow through it in all directions. I do not know whether they eat it or not, in the mature stage; but they form little hollow pellets of the unsavoury material, and lay their eggs inside. The larvæ feed upon the walls of their cells, pupate, and, in due time, force their way to the outside world.

The various species of *Cryptomorpha* are mostly found in, or on, dead leaves; and I believe their larvæ are unknown. Other members of the family, *Cucujidae*, have very peculiar larvæ. That of *Isaphes bicolor*, $1\frac{1}{2}$ in. in length, and no thicker than a shilling, has a peculiar process on the end of the abdomen. These larvæ live between the outer and inner bark of the Eucalypts, hence their flattened form.

CONCERNING "CUSHION" PLANTS.

The Andean and sub-Antaretic American floras have a special interest for us on account of their close kinship with those of Australia and New Zealand, and the short account, by F. W. Pennell, in the last Annual Report of the Academy of Sciences of Philadelphia, of a botanical expedition to the Andes makes one eager for the detailed description, which doubtless will be published in due time.

Mr. Pennell, who is a member of the scientific staff of the Academy, was chiefly concerned in the vegetation of the high plateaus, or *paramos*, corresponding to the fell fields in northern countries, and the *punas*, or Alpine deserts, of Western Colombia. The *paramos* are isolated areas, at very high altitudes, as much as 17,000 feet, or even more, whose plant cover is characterised by the presence of various curious composites, belonging to several genera, and locally known as *frailejones*, associated with scattered herbs of rosette, tufted or "cushion"-growth forms. Each *paramo* seems to have evolved a *frailejon* peculiar to itself. The plants vary in height, up to 10 feet, and are densely clothed with silvery or golden hairs or soft wool. In the case of *Espeletia grandiflora*, which is about 6 feet in height and unbranched, there is also, below the inflorescence and upper leaves, an investment of dead leaves as thick as a man's body.

Of the "cushion" plants, Mr. Pennell writes:—" . . . but denser colonies were formed by an Alpine plantain and by certain composites and monocotyledons. One of the last, growing at the edge of pools in the valley's head, forms rounded coralline cushions of almost rock-like hardness, and with the outline as precise as any pattern. Although its short leaves projected vertically, and one walked on the leaf-tips, these were so rigid and strong that no impress from the human foot could be detected."

Dr. Robert O. Cunningham, in his "Notes on the Natural History of the Strait of Magellan and West Coast of Patagonia," had the same experience with the famous balsam-bogs (*Bolax gummifera*), which he found so compact in their structure that he was able to jump on them without leaving the print of his feet.

Even stronger proof of their hardness is given by Dr. Reiche in his "Chilienflora" (Engler's Veg. d. Erde), regarding the cushions of *Azorella madreporica*, another Umbellifer closely allied to the *Bolax*, which are "so hard and solid a mass that if one fires a revolver at them the ball glances off, being quite unable to penetrate it." Skottsberg in "A Botanical Survey of the Falkland Islands" also refers to their extreme hardness.

"Cushion" plants, or those with a closely-knit scheme of branching assuming a rounded shape, occur, of course, in all parts of the world, but the very hard "cushions," better called "boulder" plants, with few exceptions (such as *Draba alpina* from Cape Chelyuskin, in the far north of Siberia, about the size and shape of a small apple and not very close and compact) appear to be confined to the southern hemisphere. Moreover, they range only down the Andes, through Tierra del Fuego, the Falkland Islands, Kerguelen Island, the sub-Antarctic Islands, New Zealand and Tasmania, occupying, in fact, the remnants of the causeway by which came, in all probability, the ancestors of the Antarctic element in our flora. It is the presence in our part of the world of this extraordinary growth form and its distribution that adds to the significance of the kinship between our flora and that of South America, and, with similar distribution of other forms of life, affords strong evidence of a once-intimate land connection between the two regions.

Some reference has already been made to our "cushion" plants, and their hardness, in a short description of the Cradle

Mountain Flora, with a picture of one of them, *Ewartia Meredithæ*, and a general view of the "cushion" plant association—Vic. Nat. XL, No. 7, Nov., 1923. Four species were mentioned as growing there, and a fifth as occurring elsewhere in the island. A sixth might have been added, *Gaimardia Fitzgeraldii*, one of the Centrolepids. In New Zealand these forms are much more numerous. The composites here afford at least nine examples, of which six are Raoulias, including the celebrated vegetable sheep, *R. bryoides* and *R. eximia*, a Haastia and two Celmisias. The Stylidiaceæ have a Phyllachne and a Donatia, which is identical with the Tasmanian plant. The Epacrids are represented by a Dracophyllum. A Gaimardia is perhaps confined to the Stewart and Auckland islands, this and an Oreobolus (Cyperaceæ) being rather smaller than the others. A Colobanthus (Caryophyllaceæ) extends throughout the Southern Islands, and *Azorella selago* is only in Macquarie Island, but this finds a place also in Kerguelen and other islands, as well as Patagonia. This perhaps completes the list, though Dr. Cockayne speaks of 55 species of "cushions" or "semi-cushions" of 22 genera in 14 families.

In Andean and sub-Antaretic America there are probably more species growing in hard-"cushion" form than are known in New Zealand, but at present we have no means of ascertaining definitely. It would appear, however, that, although the members of many families have thus shown their ability under stress of circumstances to assume this very convenient form, and have come to resemble one another so closely, the composites, at least at this, and the Umbellifer at the other end of their range, seem to provide the greatest number of examples.

Ensuring almost absolute stability, comparative evenness of temperature, protection against desiccation, reduction of transpiration to the minimum, and enabling the plant to take complete advantage of its dead parts for its own nourishment, this growth form must make for extreme longevity, and is an adaptation to a particular and extreme set of conditions perhaps more perfect than can be found elsewhere in the vegetable world.

NOTES FROM FIELD AND STUDY

[Members are invited to contribute paragraphs for this section of the *Naturalist*, which should become a popular miscellany. Original notes, of course, are most desired; but gleanings from scientific literature, unlikely to be seen by the majority of members, will also be welcomed.]

GANG-GANG COCKATOOS AS BERRY-EATERS.

The seeds of Eucalypts are eaten freely by Gang-gang Cockatoos (*Callocephalon fimbriatus*), but it may not be generally known that these birds have a strong liking for "haws," and often rob the hedgerows of their autumn glory. When I was at Wandiligong, in April last, Mr. W. Goldsworthy, J.P., a close observer of bird life, told me that Gang-gangs came every year to reap the harvest of Hawthorn berries. In March or April, as the "haws" ripen the birds appear, in small flocks; and when they depart there are no clusters of crimson fruits along the hedgerows. The Cockatoos seem to work systematically, stripping one "section" at a time. Thus they move round the district, leaving, at last, in quest of another harvest. They may not be seen in the valley again until autumn once more is preparing the "feast of haws" for them. When feeding, the birds display little fear of man. In Bright, where the Hawthorn grows, one may walk beneath the Gang-gangs at their meal. The local name for this species is "Grey Galah," favoured also in other districts.—C.B.

BETTERIES AND ANTS.

In a North-Western Mallee district I devoted some time to collecting at night, with the aid of an acetylene lamp. Around the butts of trees many examples of the beetle, *Liparochnrus gemnatus*, Westw., belonging to the sub-family Trogides of the Searabæidæ, were secured (probably one hundred or more were noticed). In all cases they were in the midst of columns of small black ants that were travelling backwards and forwards. I watched carefully, but did not once see a beetle interfered with by the ants.—F.E.W.

In the Fitzroy Gardens one day I saw a rat run across a path, and beneath some shrubs close to the artificial pond. A few minutes later a Kookaburra (*Dacelo gigas*) darted from a bough above the shrubs; followed fluttering and rustling in the undergrowth, then the bird emerged with the rat firmly held in its beak, and flew off among the neighbouring trees.—L. L. HODGSON.

PUPATION OF THE CONVULVULUS HAWK-MOTH.

At Murchison, on March 21, I collected two caterpillars of the *Convolvulus* Hawk-moth, *Protoparce convolvuli*. They were feeding on *Convolvulus* leaves, and were almost full-grown. I placed them in a breeding cage, and supplied them regularly with "Morning Glory" leaves. The larger of the two specimens ceased feeding on March 28, and shortly afterwards became exceedingly active. It would crawl about for 10 or 12 minutes, then suddenly becoming motionless, remain stretched on the bottom of the cage for about the same length of time. It had lost its beauty, being of a yellowish colour, while the distinctive stripes had become faint. On the 29th this caterpillar was still subject to restless moods, alternating with periods of complete repose. Sometimes it would bury itself in the loose soil and debris covering the floor of its cage, having longer periods of inactivity than formerly. It was much shrunken in appearance now. On the 30th it was very active at intervals, but was unable to climb. It was of a uniform, dirty brown colour; the stripes had completely disappeared, and it measured only 1 6-8 inches in length. Restlessness, with intervals of repose, continued until April 8, when the caterpillar pupated.

On April 1 the other caterpillar ceased to eat, and behaved in exactly the same way as its fellow, until April 13, when it pupated. I failed to find traces of a cocoon, or fastenings of any description. These Hawk-moth caterpillars, apparently, do not spin. The larval skin splits completely, at the head. The pupa, shortly after emergence, is very prettily coloured, the head and thorax being light green, merging into yellow towards the tip of the abdomen, which is bright red. The green and yellow gradually fade until, two days after pupation, the pupa is of a uniform rich-chestnut colour.—H. W. DAVEY.

BIRD ENEMY OF EMPEROR GUM MOTH LARVÆ.

Some Eucalypts in my garden at Darling having been topped, young growth attracted many Emperor Gum Moths, *Antheræa eucalypti*, which were seen ovipositing on the tender shoots just before nightfall. The larvæ of this moth are voracious, and very soon branches were completely defoliated. Many of the caterpillars, about this time, were half-grown. Then a pair of Black-faced Cuckoo-shrikes, *Graucalus melanops*, arrived in the garden, and commenced to prey upon the larvæ. My trees were "cleared" in three days. As the most of the larvæ were on twigs too small to support the birds, they were taken "on the wing." A Cuckoo-shrike would perch on a branch of a taller tree nearby, and gaze intently down upon the infested tree, until a larva was located, when the bird would swoop and deftly remove the caterpillar without alighting. If, as happened occasionally, a miss was "registered," the bird would turn gracefully in its flight, hover over the twig, and secure its prey.—F. E. WILSON.

CARNIVOROUS LAND SNAILS.

The finest Victorian land shell is that of *Paryphanta atramentaria*, Shutt, and its tenant is a most interesting snail. Last year I sent two specimens to Mr. Hugh Watson, of Cambridge, England, a brilliant anatomist, who specialises in terrestrial mollusca. He returned a mounted radula, with a note: "This snail, *P. atramentaria*, has a fine radula, as you will see. It is of the specialised type, found only among the carnivorous genera. . . . *Paryphanta*, of course, like most carnivorous snails, has no jaw." The radula is a beautiful object, under the microscope. Before I was aware of this snail's true nature, I enclosed a live one, with two specimens of *Helicarion cuvieri*, Fer., in a small collecting tin. *Paryphanta* devoured its fellow-prisoners, and spoiled their delicate honey-coloured shells.—C.B.

SOCIAL LIFE IN THE INSECT WORLD.

Intensive study of the habits of Australian ants, wasps and bees should be undertaken. New species are being described; but there are very few workers in the vast field, Behaviour. After reading Professor W. M. Wheeler's "Social

Life Among the Insects," and other recent books of the kind, one realises the need for systematic observation of even our most "familiar" species. In Europe and the United States of America, the study of insect behaviour has attracted many distinguished naturalists. Books on ants and wasps are nearly as popular as those dealing with birds and wild-flowers. Some contain references to Australian species; and the deep interest attaching to our insect fauna is realised, especially in America. The veteran Myrmecologist, Auguste Forel, has devoted five volumes (published 1921-23) to a fascinating subject, "Le Monde Social des Fourmis comparé a celui de l'Homme." This work, judging by the reviews, if translated into English, would rival Fabre's studies of wasps and bees, in popularity. Dr. Forel kindly sent to me a copy of his paper, dealing with ants collected by the Swedish Scientific Expeditions to Australia, 1910-1913. He describes several new species of the remarkable genus *Orectognathus*, from Cedar Creek, Queensland; and recently (May 2), at Ringwood, I found an ant which closely resembles his figure of *O. Mjobergi*. A solitary specimen, it was lurking in moss. It has been sent to Mr. John Clark, of Perth, W.A., our leading authority on ants, for determination.—C.B.

LIFE HISTORY OF MIDGES (*CHIRONOMIDÆ*).

BY J. SEARLE.

One group of aquatic larvæ that has received very little attention from our entomologists is that of the Midges, small, dipterous insects resembling mosquitoes, another branch of the same family.

The commonest form met with by the pond-hunter is *Chironomus*, the "Bloodworm," or "Weaver," as it is commonly called. When fully grown this larva is about three-quarters of an inch in length, and of a deep-red colour—hence the popular name. This colour is due to the presence in the blood of the larva of the substance hæmoglobin, the colouring matter of our own blood. "Weaver" refers to the undulatory motion of the body when protruding from the tunnel, which the larva makes for its protection by binding together fragments of vegetation and debris in an untidy mass. This

weaving motion draws a stream of water through the tunnel, and, no doubt, aids respiration.

The larva has a pair of legs attached to the segment following the head, and another pair on the last segment of the body; these legs each bear a crown of numerous recurved hooks. The larva feeds on decaying vegetable matter. Just before pupation, the rudimentary wings and legs of the future fly may be discerned under the skin of the worm.

The pupa is furnished with tufts of respiratory hairs on its anterior end, and retains an active existence while the wonderful changes are proceeding beneath the pupa skin. When the metamorphosis is complete the pupa wriggles to the surface of the water, the pupal skin splits, and in an instant the imago flies off to meet its mate and begin another life cycle. *Chironomus* does not feed in the winged state. It is remarkable the rapidity with which the imago issues from the pupal envelope. I remember, on one occasion I was examining the contents of a bottle of "pond-life," when I noticed a *Chironomus* pupa wriggling to the surface. I called the attention of a friend, who was at my side, to the pupa, but before he could take the bottle from my hand the imago had emerged and was flying towards the window.

The eggs of *Chironomus* are laid in jelly-like masses, attached to surface weeds generally. Some species lay their eggs in a spherical mass about the size of a large pea, others in sausage-shaped strings. The eggs themselves are cigar-shaped, slightly pointed at each end. Two other groups of *Chironomidae* are common in our ponds; they are the *Ceratopogon* and the *Tanytus*.

Ceratopogon is a long, footless, snake-like translucent larva; at the caudal end it has eight long setæ and a few short ones.

Tanytus are elongated, cylindrical larvæ, with a long, narrow head. It is remarkable for its retractible antennæ, which may be drawn back into sockets in the head or protruded at pleasure.

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EXCURSIONS.

SATURDAY, 30th MAY.—Zoology School, University. Leader,
Miss J. Raff. M.Sc., F.E.S. Object: Elementary Zoology.
Meet at Wilson Hall, University, at 2.30 p.m.

KING'S BIRTHDAY, 8th JUNE.—Mt. Evelyn. Object: General.
Leader: Mr. C. Oke. Meet at Flinders St. Station for 8.7
a.m. train. Lunch should be taken.

SUBSCRIPTION RATES AND RULES.

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— OF —

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The Author of each article is responsible for the facts and opinions recorded.

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1925.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR ANNUAL MEETING.

MONDAY EVENING, 15th JUNE, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—

PROPOSER.

SECONDER.

Mrs. F. Pitcher,
"Frechencourt,"
Punt Hill, Sth. Yarra.

Mr. F. Pitcher.

Mr. J. Stickland.

Mr. G. F. Hill,
National Museum,
Melbourne.

Mr. J. A. Kershaw.

Mr. C. Barrett.

Mr. W. E. Jones,
28 Clyde Street,
Surrey Hills.

Mr C Oke.

Mr. H. B. Williamson

Mr. A. S. Robertson,
22 Mayfield Avenue,
Malvern.

Mr. C. Barrett.

Mr. C. Oke.

3. Nominations for Membership.

4. General Business.

Election of Office-bearers and Committee, 1925-26.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Mueller Centenary.

Address by Sir Baldwin Spencer, K.C.M.G., F.R.S., D.Sc.—"The Life and Work of Baron Ferdinand von Mueller." ("Mueller" exhibits are particularly desired.)

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

Subscriptions for the year 1925-26, at the new rate, became due on May 1:—Ordinary Members, 20/-; Country Members, 12/6.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

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No. 498.

FIELD NATURALISTS' CLUB OF VICTORIA.

BUSINESS.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, 11th May, 1925. The President, Mr. J. Searle, occupied the chair, and about fifty members and friends were present.

REPORT OF EXCURSION.

A report of the excursion to Ringwood on Saturday, 2nd May, was given by the Leader, Mr. H. B. Williamson. Dr. C. S. Sutton gave some notes on the Eucalypts of the district. (See page 27.)

ELECTION OF MEMBERS.

On a ballot being taken, Miss Webb, "Arundel," Commercial Road, Prahran, and Mr. A. F. Archer, M.A., Headmaster Caulfield Grammar School, were elected unanimously as ordinary members of the Club.

Messrs. L. Hodgson and J. R. Leslie were unanimously elected as Auditors, on the motion of Messrs. A. J. Tadgell and G. Coghill.

GENERAL BUSINESS.

Office-bearers for 1925-26. Nominations were made as follows:—

President.—Mr. Geo. Coghill (proposed by Mr. H. B. Williamson and seconded by Mr. F. G. A. Barnard).

Vice-Presidents.—Mr. F. G. A. Barnard (proposed by Mr. F. Pitcher, seconded by Mr. C. Oke), Mr. A. E. Keep (Mr. Barnard and Dr. C. S. Sutton), Mr. J. A. Kershaw (Messrs. Oke and C. Lambert), Mr. E. E. Pescott, F.L.S. (Messrs. F. E. Wilson and G. Coghill), Mr. P. R. H. St. John (Messrs. F. Wisewould and F. Chapman), Mr. F. E. Wilson, F.E.S. (Messrs. J. A. Kershaw and C. Barrett).

Hon. Treasurer.—Mr. A. G. Hooke (proposed by Mr. Oke, seconded by Mr. Pitcher).

Hon. Librarian.—Dr. C. S. Sutton (proposed by Mr. Coghill, seconded by Mr. H. B. Williamson).

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Hon. Secretary.—Mr. C. Oke (proposed by Mr. Williamson, seconded by Mr. Barnard).

Hon. Assistant Secretary and Librarian.—Mr. H. B. Williamson, F.L.S. (proposed by Dr. Sutton, seconded by Mr. H. Hughes).

Committee.—Mr. F. Chapman, A.L.S. (proposed by Mr. Wilson, seconded by Mr. Coghill), Mr. F. Cudmore (Messrs. Kershaw and Daley), Mr. C. Daley, B.A., F.L.S. (Messrs. Kershaw and Williamson), Mr. L. Hodgson (Messrs. Coghill and Wilson), Mr. H. Hughes (Messrs. Daley and Pitcher), Mr. C. Lambert (Messrs. Pescott and Gray), Mr. F. Pitcher (Messrs. Pescott and Gray), Mr. A. Rodda (Messrs. Pescott and Gray), Mr. J. Stickland (Messrs. Pitcher and Daley).

Otway Forest Area.—Mr. F. E. Wilson moved, "That a letter of appreciation of the Government's action in preserving the Otway Forest reservation be sent to the Premier." Seconded by Dr. C. S. Sutton, and carried.

Nature Notes.—Mr. Oke made some remarks on the "Tracks of the Common Garden Snail." He expressed the opinion that the nature of the surface traversed had little or no effect upon the character of the "trail."

Mr. Oke gave an account of a Spider migration. (See article on another page.)

EXHIBITS.

By Mr. G. Coghill—Climbing Polygonum, *Polygonum baldschuanicum*; a pretty creeper, but likely to become a pest.

By Mr. C. Daley—(1) Photographs of Upper Murray district, Swampy Plains River and Gehi, taken by Messrs. F. Cudmore and E. J. Roberts; (2) waterworn pebbles from Swampy River, near the foot of Mt. Kosciusko; (3) sketches made at Gehi, Swampy River.

By Messrs. E. E. Pescott and C. French, Jun.—Herbarium specimen of Long-tongue Greenhood, *Pterostylis grandiflora* (R.Br.), with three flowers on one stem.

By Mr. E. E. Pescott—(1) Stone axes, aboriginal, from Geelong, Vic., and Warren, N.S.W.; (2) glass spear heads, aboriginal, from Daly Waters, N.T. (one very large); (3) garden specimens of the Bird Flower, *Crotalaria laburnifolia*.

EUCALYPTS AT RINGWOOD.

Eleven species of Eucalypts were noted on the occasion of the excursion to Ringwood on Saturday, 9th May—a fair number considering the small area covered. About the station the Silver-leaf Stringybark, *E. cinerea*, var. *multiflora* prevails, this tree being a feature of the Lilydale road east of Box Hill. The Common Peppermint, *E. australiana*, was next noticed, and the Long-leaf Box, *E. claophora*, whose most redeeming quality lies in the occasional beauty of its juvenile foliage, which sometimes closely approaches in likeness that of the Candle-bark Gum, *E. rubida*, though generally much coarser. Near the Mullum Mullum Creek some rather good specimens of the Swamp Gum were growing. This species, long regarded as *E. Gunnii*, or as *E. acervula*, Hook., was described by Baker as *E. paludosa*, but eventually considered by Maiden to be Labillardiere's *E. ovata*. It is a question, however, whether *E. acervula* is not still mixed up with it. Although we saw numerous clumps of suckers with the charming, sleek, grey leaves of the Yellow Box, *E. melliodora*, we did not meet with a tree until crossing a bend of the creek. Evidently its good qualities are recognised, for it has been almost entirely cut out hereabouts.

The Red Stringybark, *E. macrorrhyncha*, and the Messmate, *E. obliqua*, were not infrequent. The Manna Gum, *E. viminalis*, whose beauty is only skin-deep, was found on the low ground, and saplings of its twin sister, the graceful Candle-bark, were seen on the drier slopes. The Blue Peppermint, *E. dives*, was recognised. Not until the limit of our outward walk was reached, on some high ground, did we encounter the Red Box, *E. polyanthemos*, this being about the southern boundary of its range in this locality, and one of the few points where it touches, and rarely intermingles with, the Mealy Stringybark. One fine old tree was seen, and a very handsome sapling with a dense head of clean, bluish-grey foliage of roundish leaves, even more attractive than that of the Yellow Box.—C.S.S.

One is accustomed to regard the Magpie-lark (*Grallina cyanoleuca*) as a peaceful bird, but it is not always so. At Greensborough recently I saw a Noisy Minah (*Myzantha melanocephala*) fly angrily out of some bushes at three Magpie-larks, and chase them to the Eucalypts nearby. A minute later the Grallinas were pursuing several Magpies (*Gymnorhina hypoleuca*), one of which called loudly as if in pain, on being pecked by its pursuer. The Grallinas remained in possession of the field.—A.J.T.

SOME GRAMPIANS' PLANTS.

BY C. W. D'ALTON.

(Read before the Field Naturalists' Club of Victoria, 9th March, 1925.)

Plants peculiar to a certain district, or rarely found elsewhere, and those occurring in widely-separated localities are generally regarded with special interest. The Grampians flora contains an unusual number of the former class of plants, and also compares favourably with the flora of other parts of Victoria, both in number of species and the beauty of their flowers. About 917 species are to be found growing in its shady gullies, or on its rugged hill-tops. Of the plants more or less peculiar to these ranges, 16 families are represented by about 30 species, a few of these being found just over the border in the north-western district, in one or two isolated patches, and some others in more distant parts, or in other States.

Taking them in order, we find a member of the Cyperaceæ, *Tricostularia pauciflora*, or the Needle Bog-rush, growing in the swampy country near the source of the Wannon River, and a few other places. Then we have three members of the Liliaceæ — *Calcectasia cyanea*, *Thysanotus dichotomus*, and *Borya nitida*. The first, the Blue Tinsel Lily, generally grows in sandy or heathy country, well out in the open, mostly in the foothills. This is extremely hard to find, except when blooming, when its satin-blue flowers, with bright yellow stamens, are most conspicuous among the dark undergrowth. It is also found, but is rare, in the south-eastern part of South Australia. The next, the Branching Fringe-lily, also a native of South and Western Australia, with a delicate, pretty flower, grows, in this State, only in the vicinity of Mt. Zero. The last I had the good fortune to find recently on Mackie's Peak, at Hall's Gap, at the northern end of the Grampians. At first it was thought to be an undescribed species, but eventually the National Herbarium pronounced it to be identical with the Western Australian *Borya nitida*, which had not been recorded previously, except from that State. Its existence here provides a puzzle for the botanists, which will be difficult to solve.

Then comes an Iris, the Blue Grass-flag, *Orthrosanthus multiflora*, also a native of South and Western Australia; and last, but not least, among the monocotyledons, we have several examples in that most fascinating of all plant groups,

the Orchidaceae. For some reason the Grampians was for many years regarded as a poor place for orchids, and as most of the older botanists seemed to regard these rugged hills as a more suitable hunting-ground for plants of larger growth, for a long time our "known" orchids numbered slightly less than 40 only. I have, however, during the last few years, principally through the assistance of Dr. R. S. Rogers, of Adelaide, and Mr. J. W. Andas, of the National Herbarium, Melbourne, raised the number to 72. As about a dozen others have been recorded for the South-west, and may possibly be collected here in the future, our record, even now remarkably good, is likely to be still better. Some species, which for a time were recorded only from here, have since been found in other parts, so our list at present of those confined to the Grampians amounts only to two or three of the following:—*Calochilus cupreus*, or Copper-beards, *Thelymitra megacalyptra*, the lilac Sun-orchid, the Veined Caladenia, *C. reticulata*, and *Caleana Sullivani*, the Spectral Duck-orchid. The first has, I believe, been reported from the south of this State, and the second from New South Wales; but the other two are entirely our own.

Caleana Sullivani was first discovered by Mr. Sullivan, 42 years ago, at Mt. Zero, only one specimen being then obtained. It was not till 10th December, 1924, that I rediscovered it on Wonderland Ranges, near Hall's Gap, and collected six specimens. It seems to like rocky hill-sides, where there is plenty of sun, and grows in the mossy crevices on the rocks in company with *Caleana minor*, which it much resembles, this likeness perhaps accounting for its not being discovered sooner. *Calochilus cupreus* is not sub-alpine, like *C. Sullivani*, but grows on the foothills, generally in tufts of short grass, where it gets protection from the ravages of sheep or rabbits. *Thelymitra megacalyptra*, on the other hand, is fond of higher ground, sometimes growing on the top of almost bare rocks, and especially at Rose's Gap, a part of the Mt. Difficult Range. *Caladenia iridescens* was also first found on this range, but has since been gathered in the southern districts.

We come now to the shrubs, of which we have a very fine collection. Starting with the Proteaceae, *Grevillea Williamsonii*, the Serra Grevillea grows, or once did grow, on a foothill of Mt. Abrupt, near Dunkeld, but as it has not been seen since Mr. H. B. Williamson collected it, in 1893, it is at present unknown to me, and perhaps may no longer exist.

there. The other, *G. olevides*, the Olive Grevillea, a very handsome shrub, with bright scarlet blossoms and fine olive-green leaves, is found, nearly always, high on the mountain peaks, generally in crevices between the rocks. Perhaps one of the most beautiful flowers in the Grampians is *Bauera sessiliflora*, the Showy Bauera, of the Saxifragaceæ. This is met with always along the banks of watercourses, and, in some places, follows the creeks for half a mile or more, and when in full bloom, from the latter part of September till the beginning of November, its long spikes of magenta-coloured flowers, with black centres, make a very fine show. The next to be mentioned is the Orange Bell-climber, *Marianthus bignoniaceus*, bearing pretty bell-shaped flowers and belonging to the Pittosporaceæ. It is sub-alpine, and generally found in gullies or creeks; also in the Mt. Lofty Ranges and on Kangaroo Island.

We are fortunate in having no fewer than five species of Leguminosæ, all of the Genus *Pultenaea*, not hitherto found elsewhere. *P. Benthamii* is a robust plant, with fine masses of yellow blossoms; *P. costata*, a low shrub with ribbed leaves and yellow blossoms, often tinged with red, a very attractive plant when in full bloom. *P. Luehmannii* and *P. Maidenii* are more slender and less conspicuous plants, but *P. subalpina*, or *rosea*, as it was formerly called, is of a beautiful rose-pink, with soft leaves. The flowers of this are remarkable in that they turn purplish when fading, so that it is almost impossible to carry them any distance without the colour changing. It is found in only two localities, one on the top of Mt. William, and the other on the summit of Mt. Rosea, which was named in honour of this rare and beautiful plant. In the Rutaceæ we have *Phebalium dentatum*, or Umbellate Phebalium, easily distinguished from the other vegetation by its truncate leaves. It grows profusely all over these ranges, being also not unknown in the Dividing Range of New South Wales, and its pretty star-like flowers, generally pinkish in colour, make a good show. It seems curious that, out of a score or more of Eriostemons and Phebaliums occurring in this State, only about four are to be found on the Grampians. *Correa amula* is another member of the family which grows here only, in this State, but also in the Mt. Lofty and Barossa Ranges, in South Australia. What I might term our own particular family, the Rhamnaceæ, contains two species, *Trymalium D'Altonii*, discovered by my uncle, Mr. St. Eloy D'Alton, a good many years ago, and *Trymalium*

ramosissium, recently found by Mr. J. W. Audas and myself, on the slopes of Mt. Difficult. The first blooms in July, but the latter not till Spring.

The family Dilleniaceæ is represented by *Hibbertia humifusa*, which was first recorded from Mt. Zero, at the northern end of the Grampians, and has been erroneously entered in the Census of our Victorian plants as being in the North-west. I have since found it in several localities in the Victoria Valley, and also in the Wild Flower Garden, near Hall's Gap. In the Myrtaceæ we have five representatives. *Eucalyptus alpina* grows on most of the higher peaks, and is seldom found lower than about 2000 feet. It is a rather dwarf Gum, with exceedingly tough branches, thereby being able to withstand the strong winds occurring on high altitudes. It has fine glossy, dark-green leaves, fairly large seed-vessels much embedded on the stalks, and flowers of a rather straggling nature, the stamens being much scattered and distant. I believe this Eucalypt has been successfully grown in some of the alpine passes in Europe, where heavy wind storms are prevalent. *Melaleuca squamea* is a handsome member of the bottle-brush family, generally found in swamps and along watercourses. It has fairly large pink blossoms, with white tips to the stamens, and leaves much beset with hairlets. It ranges in two directions, from the Tasmanian mountains up the east coast of New South Wales, and by way of the S.W. of South Australia to this locality.

Calytrix Sullivanii, or Grampians Fringe-myrtle, is strong growing, and likes open, sunny situations; its cousin, the Snow Myrtle, *Lhotskya genetylloides*, on the other hand, here hides its graceful pink flowers in shady glens or between rock-walls where the sun does not penetrate too strongly. In the North-west, however, it is found in open situations, like the *Calytrix*, which is also not unknown there. Both are easily grown in gardens or parks, where they make fine ornamental shrubs. *Thryptomene Mitchelliana*, or Grampian Heath-myrtle, is also admirably adapted for cultivation, and can, if clipped, be made into a very serviceable hedge. It is also a good carrying plant, and will last in water for several weeks. This fine shrub was named in honour of that great explorer, Sir Thomas Mitchell, who discovered and named the Grampians. Another Myrtaceous plant which might be mentioned, although it occurs elsewhere in similar situations, is the handsome variety *grandiflora* of *Leptospermum lanigerum*, locally known as the "Wild Apple Bloss-

som." This has much larger flowers and leaves, grows in quite different soil, in rock crevices often high up in the mountains, and blossoms a month later than the typical form, which is also always found in swampy country.

Of the Epacridaceæ, we have two fine species in *Leucopogon thymifolius* and *Brachyloma depressum*, both sub-alpine here, the latter being about the finest of the Brachylomas, growing fairly tall and having fine sprays of creamy-white flowers, much frequented by bees for honey. It is also known from the East coast of Tasmania and the islands of Bass Strait. Labiatae affords only one rather poor example in *Prostanthera debilis*, a slender plant with flowers much scattered, or generally in pairs and pale lavender in colour. Last, is that curious little member of the Stylidiaceæ, *Stylidium soboliferum*, or Bristly Trigger-plant, with its curious rosette leaves flat on the ground, and bright pink flowers on straight stalks a few inches in height. This generally grows on mossy banks in moist situations, and should make a good bordering for flower beds, provided the locality is not too dry.

Summing up, we appear to have about a score of plants confined to these ranges, and all but two or three of the others mentioned seem to have come to us from the West, and here find the limits of their range in an easterly direction.

A RECORD OF SERVICE.

The retirement of Mr. F. G. A. Barnard from the position of Hon. Editor of the *Victorian Naturalist*, an association which members of the Club had come to regard as permanent, marks the close of an epoch, but, happily, not a career of service. An epoch is a period "marked by special events;" and many events of note in the Club's history have occurred during the period of Mr. Barnard's editorship. His services have been varied and always efficient: he has been generous with gifts of his "leisure" time for 32 years.

Mr. Barnard is one of the six original members of the Club who remain with us. His service in office commenced soon. After a year on the committee in 1884, he was elected Hon. Secretary of the Club, and for six years continued to hold that position; then he became Hon. Librarian. In December, 1902, on the withdrawal of Mr. A. H. S. Lucas from the office, after eight years of valued service, Mr. Barnard consented to act as editor of the *Naturalist* "for a time." That time extended to April, 1925.

For the years 1903-5 Mr. Barnard was Vice-President of the Club, and in 1905-7 occupied the Presidential chair. In 1908 he was again installed as Hon. Secretary, and acted in that capacity for two years. His editorial duties were performed as usual while he held the other offices. His zeal in the interests of the Club has been unabated for 45 years. Besides discharging official duties most efficiently, he has dealt with subsidiary affairs, constantly arising, in the same characteristic manner.



MR. F. G. A. BARNARD

Mr. Barnard has edited 7,874 pages of the *Naturalist*, as compared with 1,492 pages published during the eight years before he assumed the responsible position so recently vacated. He has introduced many improvements in the style of our journal, maintaining the high standard which gained it repute among naturalists throughout Australia and in other countries.

In addition to editing numberless contributions, many of which bristle with scientific terms, Mr. Barnard has dealt skilfully with reports of Club meetings and excursions, has reviewed books, etc., and supervised the details of publication.

A naturalist with wide interests, Mr. Barnard has contributed many pleasant and instructive accounts of his outings and longer journeys, and valuable papers on various subjects.

A paper, "Are Popular Names for Victorian Plants Desirable?" read in Sept., 1906, originated the work of the Plant Names Committee, of which Mr. Barnard was a member, and led to the subsequent publication of "A Census of the Plants of Victoria."

In a Presidential Address, during his term of office in 1906, Mr. Barnard dealt with "The First Twenty-five Years of the Field Naturalists' Club of Victoria" (*Naturalist*, Vol. 23). This paper subsequently was supplemented by one summarising the Club's history from 1905 to 1920 (*Naturalist*, Vol. 37). His Presidential Address, delivered 6th June, 1917, was entitled, "The Facilities for the Study of Natural History in Australasia" (*Naturalist*, Vol. 24). At the Club conversazione, April, 1885, Mr. Barnard gave an entertaining lecturette on "Insects and their Metamorphoses." Among his many other activities may be mentioned the management of the earlier Wild Flower Exhibition, as Hon. Secretary of the Club, in the days when suburban expansion had not obliterated the floral wealth of scrub and bush, then easily reached from the city. Mr. Barnard, from his long experience in the work of the Club, has given valuable assistance to its officers, and always he has been helpful to members requiring information, assistance, or encouragement in nature study. A valuable adjunct to organisation is the "Excursion Programme" introduced by Mr. Barnard, who, as leader and adviser, has played a prominent part in Club outings. He is familiar with all the highways and byways radiating from Melbourne to mountain, plain, and stream.

During Mr. Barnard's intimate connection with the Club its members have, several times, delighted to honour him. Thus, on the occasion of his marriage, and in recognition of his services as Hon. Secretary, in September, 1889 (*Nat.*, Oct., 1889), he was presented with an address, a clock, and a purse of sovereigns. In July, 1918, on completion of 25 years' editorship, he was the recipient of a pocket aneroid barometer. In February, 1923, as a foundation member, he was elected a Life Honorary Member of the Club.

Mr. Barnard has carried into other walks of life that thoroughness and zeal which signally mark his career as a

member of the Field Naturalists' Club. Succeeding to his father's old-established business in 1902, he has successfully carried it on as a registered pharmacist. In 1915 he was elected President of the Metropolitan Chemists' Association. Mr. Barnard, always keenly interested in public affairs and local advancement, has been connected at Kew with the Public Library, School Committee, Cricket Club, Horticultural Society, etc. In 1915 he secured election to the Kew Council, and was appointed to the honourable position of Mayor of the municipality, which, during his term of office, was proclaimed a city. In 1910 Mr. Barnard wrote a history of Kew, dealing with the rise and progress of the district. For many years he has been a member of the Council of the Historical Society of Victoria, and he has also submitted to the Society interesting papers on early historical matters.

Thus, quietly and unostentatiously, Mr. Barnard has brought to the performance of his various duties, public and private, soundness of knowledge and earnestness of purpose, which have ensured success in every way, and his genial and kindly nature and courteous disposition have brought him "honour, love, obedience, troops of friends." The members of the Field Naturalists' Club regret his retirement from the office of editor, so long and so faithfully held, appreciate to the full his loyalty and devotion to the Club's interests, and trust that he will be spared for many happy years.

MIGRATION OF SPIDERS.

Walking along Chaucer Street, St. Kilda, in the afternoon, on 27th April, 1925, I observed that fences, garden plants and house-fronts were festooned with strands of spider-silk. Over the reserve facing the street, too, many strands were floating. Though some strands were several feet in length, the most of them were tangled into an irregular, criss-cross mesh. I caught several of these fairy "balloons," but only one had a "pilot" or "passenger"—it proved to be a mature male.

Some of the strands along the fences were examined, and spiders belonging to three different families were obtained; one a matured male; another a matured female. All these specimens may have been local spiders, that seized the threads as they came to rest, hoping to catch the owners and eat them. It is generally thought that only the young

spiders migrate, from the place of their birth, in quest of territory where they may have a fair chance of living in plenty. However, I certainly captured one mature male "ballooning"; while several others seen floating by were too large to be young ones.

Passing through Luna Park Gardens, I saw, everywhere, evidences of the migration. On pine trees and palms, and on the lawns, were innumerable strands of silk. It was the same along the Esplanade; clinging to the ramp were thousands of strands, many of them 9 feet or 10 feet in length. And hundreds of the tiny "balloons" were floating over from the direction of the Bay. I went to the beach, and found that the spiders were coming across the water, on a fairly strong breeze, blowing from a point below the You Yangs—a journey of some miles for the spiders, if this was the line they followed. But it is possible that they had been blown over the Bay, from the Tea-tree scrub at Brighton or Sandringham, and then across to St. Kilda. Even so, the journey would be three or four miles.—C. OKE.

These observations, given at the Club's May meeting, were discussed by several members.

Mr. A. L. Scott said that on, or about, 27th April, he had seen, along the fences of Elsternwick Park and of private houses, thousands of long spider-threads.

Mr. F. E. Wilson remarked that he had been surprised one day, while bathing at Chelsea, to see large numbers of spiders' "balloons" floating overhead. At the time, he felt convinced that they were coming right across the Bay, as the coast-line at Chelsea was practically straight, and certainly had no headland likely to give spiders a "send-off."

Mr. Searle stated that he had seen bushes smothered with gossamer. Migration was the usual method by which young spiders secured dispersal.

In reply, Mr. Oke said that he was convinced the migration was not confined to young spiders. The "tailed" spider, *Arachnura higginsii*, sometimes bred in colonies, a hundred or more individuals selecting the same tree, and as each spider had three or four capsules of eggs, an immense number of young ones were born among the boughs. But, the stronger and older members of the young brigade devoured many of those less advanced. Thus, though considerable numbers did "balloon," the migrations of this species were not so impressive as the one he had just described.

PLATE I.



YOUNG "MAJOR MITCHELL" COCKATOO.

[Photo, C. Barrett]

A VISIT TO THE UPPER MURRAY.

BY C. DALEY, B.A., F.L.S.

(*Read before the Field Naturalists' Club of Victoria,
11th May, 1925.*)

With a fishing party, in March of this year, I visited Swampy Plains River. Mr. F. Cudmore, a fellow-club member, was one of our number. Our route was by the North-Eastern railway to Wodonga, where we changed to the mountainous line running eastward as far as Cudgewa, distant from Melbourne 255 miles.

To the north-east of Cudgewa lies Pine Mount, while an imposing peak to the north-west is Mount Burrowes, 4181 feet. From Cudgewa, without delay, we motored in the moonlight and through keen bracing air to Corryong, a thriving pastoral town, around which some gold-mining has been carried on intermittently, with varying fortune. Passing through intervening hills, a descent was made through the Tawong Gap. Between the station of the same name and the picturesque Mount Elliott run. Here we obtained a charming and most extensive view over the Murray River flats and adjacent mountain ranges.

Crossing the Murray River bridge, just below where the Swampy Plains River joins its waters with the main stream, we passed through the Bringenbrong Station, famous for its excellent cattle and well-bred horses. We were now on plains of some extent, in the basin of the Murray, and our driver preferred, in the darkness, to take a longer, and safer, course among the hills to the north-eastward. In and out we passed through the Khancoban district, emerging on the Swampy River plain; crossing creek after creek, and then the river itself, until, at last, we reached Waterfall Farm, on the Swampy Plains River. Travelling from Corryong to our destination, we had to open and close fourteen gates in passing through the estates. We crossed the river over a suspension bridge, 150 feet in length and 25 feet above the stream. As we carried our luggage across in the darkness, the swaying of the wire bridge gave a feeling of insecurity. A short ladder is fixed on each side up the steep boulders, on which the bridge is securely stayed.

Mr. Scammell's Waterfall Farm, on the high ground, is the farthest-out place on this track towards Kosciusko. The river is a stone's throw from the house, and the noise of its

waters passing through the rapids is soothing and pleasant. The Swampy rises in Mt. Kosciusko, and here, at Khancoban, coming through the mountain gorge, it follows the base of a line of hills forming its southern bank. From its edge a broadening expanse of rich alluvial plains stretches northward to the hills, and westward along its course through the Khancoban and Bringenbrong runs.

After a good night's rest, following a twenty-hours' journey, we were ready, in the morning, to try our fortune in the stream. The river, rapid and clear, flows over rounded pebbles and boulders, mostly granitic or schistose in character, and varying in size, but generally larger, we noticed, as we followed the river up to its source. The Swampy is remarkably free from snags, and devoid of mud, the rounded stones in its bed making it awkward sometimes for one to preserve balance in the stream. Rapids are numerous; deep pools, in which the trout love to linger, occur under the steeper banks. Vegetation along the river's banks usually is not dense enough to be an obstacle to fishing, and so sportive trout can be played with a reel and a very lengthy line. No other kind of fish seems to inhabit the river. Before breakfast, one enthusiast returned with a Rainbow Trout which weighed 4 lbs.; and the catch for the day was 27 fish, varying from 1 lb. to 4 lbs. in weight. Next day 20 was the total; then 32, a dozen of which were caught with the dry fly by Mr. Cudmore, the five largest weighing 17½ lbs.—fine specimens of the Rainbow Trout, which has been so successfully introduced into our mountain streams.

On Tuesday, with an imposing cavalcade of nine riders and two pack-horses, laden with camp equipment and provisions, we left Waterfall Farm for the Gehi, about fifteen miles distant. At first the bridle-track leads high above and along the side of the steep gorge, gradually descending to a ford. From here the country is practically virgin forest, open and park-like in aspect, with sparse undergrowth, the trees being chiefly Blue Gum, *E. globulus*, Stringybark, *E. obliqua*, Peppermint, *E. australiana*, Silvertop, *E. sieberiana*, and Gum Myrtle, *Angophora intermedia*. Patches of Wild Cherry, *Exocarpus nana* (?), and here and there Sweet Bursaria, *B. spinosa*, in flower, appeared. Along the Swampy River and its subsidiary creeks the Woolly Tea-tree, *Leptospermum lanigerum*, grew, also Manuka, *L. scoparium*, with Black and Silver Wattles, Pultenæas and Grevillias. On the plains. Red

Gum, *E. rostrata*, and Swamp Gum, *E. ovata*, were to be seen. Few introduced plants have, as yet, established themselves. The Autumn Orchid, *Eriochilus autumnalis*, was in bloom, and occasionally the Purple Loosestrife, *Lythrum salicaria*, showed a striking patch of colour among tussocks. Pasture was abundant, and it was a pleasure to ride through the forest primeval, untouched as it is by the ravages of fire or the axe.

Our party being a large one, animal life was not very evident. A fox and a kangaroo, in hasty retreat, were sighted. Rabbits, in some places, were numerous, also Opossums, and on the edges of the river plains there was evidence of the presence of Wombats. After proceeding for some miles, we came to the abrupt Gehi wall, the eastern slope of a precipitous range. Down the steep wall the bridle-track follows closely the runnel of a small stream, which the horses had to negotiate very steadily and circumspectly. As the little stream increased in volume of water through soakage from the hills, Tree-ferns, and the usual accompaniment of smaller ferns, appeared, while Blackwood, Hazel and Blanket-leaf also grew in the saturated ground, but not with the luxuriance of the gully vegetation of eastern New South Wales or Gippsland. The descent to the river-flats being made without mishap, after easier riding we again met with the mis-named Swampy, flowing with undiminished force. We crossed several times, on the way to Gehi camp, situated on the river-flat about 100 yards from the stream, with hills and mountains rising on every side. The Gehi frowns behind, and eastward up the river, Kosciusko, 7308 feet, raises its bare, grey head, weather-beaten and scored by exposure to destructive atmospheric agencies through aeons of time. Its lower slopes are wooded; but past the Snow Gum line imposing cliff-faces in succession rear themselves, devoid of vegetation to all appearance, and presenting, buttress-like, a bold front to the disintegrating elements which ever beset them.

Mt. Townshend, 7260 feet, to the north, also stands out boldly. The view of the range, looking up the Swampy River, is inspiring. The ceaseless play of sun and shadow gives frequent change in the aspect of the peaks. No snow is visible from the western side, although probably patches remain throughout the year in sheltered valley slopes on the southern aspect.

Over the elevated Kosciusko plateau there is evidence of a series of glacial epochs, of which the mount was undoubtedly

the centre, probably in the Cainozoic era; Professor David suggests that, in the very late Pliocene, or early Pleistocene times, the eastern coast of Australia, through considerable earth movement, was greatly raised in altitude, the Kosciusko area to a height of 7000 feet above sea-level; and that, a glacial age supervening, this area had an ice-cap of about 2000 feet. In the district visited along the Swampy to Kosciusko the formation of the ranges, as observed, was mostly granitic; in some places the rocks were metamorphic in character. The rock *débris* of the river and streams brought down from this great mountain system, is mostly of granitic or schistose origin, and of metamorphic rocks. On the river-flats of Gehi are evidences in dry, boulder-strewn water-courses, as well as in the running stream, of torrential conditions, perhaps partly very remote, when flood-gates are opened with the melting of the winter snow on the mountain slopes.

In its Alpine and forestal setting, Swampy River is a beautiful stream, quick-flowing, clear and sparkling, as it hurries down to the lordly Murray, thirty or forty miles distant, deep pools, pebbly shallows, and frequent rapids occurring in its course. It is an ideal fishing stream, partaking of the nature of the famous Scottish streams. At the back of the camp at Gehi was a range of hills, and across the river a similar range, well-wooded, the fairly extensive river flats extending eastward up the valley. On the southern bank, about half-a-mile distant, and above a deep layer of water-worn stones, evidently an ancient river deposit, was a layer of dark soil, the edge of a flood-plain with good pasturage along the river-course.

On Wednesday an early start was made under most favourable conditions as to weather, and more than ninety fish were caught, Mr. Cudmore, with the fly, being the most successful. Only about one-third of the fish hooked were retained for food, the remainder being returned to the river. Some of the largest fish were smoked and dried. It was understood that no fish under 2 lbs. was to be kept. The largest fish caught, near Seammell's, was 2 feet in length, and weighed 4½ lbs.; the heaviest was about 6 lbs. in weight. Rainbow Trout, by their agility and alertness, especially when about 3 lbs. in weight, test the skill and patience of the angler. Grasshoppers, used for bait, were numerous at Gehi, and were easily caught in the rich grass. An exceedingly heavy dew occurred each night; it was preceded by a fog, which settled down

so as to hide the mountains. In the morning it slowly lifted, and became quickly dissipated before the sun's rays, the air being very clear and bracing, "each dew-laden air-draught resembling a long draught of wine." There were some very beautiful effects where spiders had woven their webs between branches, the wonderful completeness and symmetry of the design being revealed in delicate tracery by the dew on each separate thread. Bird-life was not abundant. Occasionally Black Cormorants, *Phalacrocorax carbo*, were seen near the river, but not in large numbers. The Wedge-tailed Eagle, *Uroaetus audax*, was frequently observed in graceful flight in mid-air, and a few Kookaburras, *Dacelo gigas*, awoke the echoes with their "laughter."

The party, in different sections, fished along the river for some miles. The strong current, the cold water, and the pebbly bed of the stream, made wading sometimes difficult. On the Thursday the most of our party left Gehi, crossed and re-crossed the Swampy, scaled the Wall, and returned to Scammell's, at Khanöban. About half-way on the journey, we heard "music low and strange" ahead of us, the pleasant tinkling of bells on a caravan of horses, which, under two riders, were on their way, loaded with salt for the "licks" in distant cattle pastures near "Tom Groggan's," on the Murray.

Two of us, on return, left Waterfall Farm, driving about four miles to catch His Majesty's mail. On the way over the plains we saw four Brolgas, *Antigone australasiana*. Birds were more numerous on the open than in the forest country, grasshoppers providing ample food for them. In the paddocks quail were numerous; on the swampy places plovers made shrill outcry, while the smaller birds of prey, such as Gould's Harrier, *Circus gouldi*, the Collared Sparrowhawk, *Accipiter cirrhocephalus*, and the Nankeen Kestrel, *Cerchneis cenchroides*, favoured this open country for their operations. Black Duck, *Anas superciliosa*, and Teal, *Nettion castaneum*, could be flushed along the river here and there, and the Common Sandpiper, *Actitis hypoleucos*, was seen on the edges of the swamps. Other birds noticed during our stay were *Streperas*, the Butcher-bird, *Cracticus torquatus*, White-winged Chough, *Corcorax melanorhamphus*, Blue Wren, *Malurus cyanochlamys*, the Blue Mountain Parrot, *Trichoglossus nova-hollandiae*, the Crimson, *Platyercus elegans*, and the Rosella Parrot, *P. eximius*, the Scarlet Robin,

Petroica multicolor, the Azure Kingfisher, *Alcyon azurea*, and Tits and Wrens in the forest country, with the Magpies. *G. hypoleuca*, and the Starlings on the open spaces. White Cockatoos, *Cacatua galerita*, were in flocks, and Black Cockatoos, *Calyptrorhynchus funereus*, occasionally were seen. We passed over the Khancoban plains through the station of that name, excellent cattle country. On a telegraph line were assembled about 200 Swallows, *Hirundo neoxena*, an unusual circumstance for the time of the year. Crossing the Swampy, we passed through Bringenbrong Station to the Murray. On the road were numerous tracks of snakes, this run being noted for snakes as well as for its fine cattle. The Swampy River plains have, to the north, high ranges, such as the Dargil. Past the gorge from which the Khancoban Creek comes to the Swampy is the rugged country of Toolong; and the plains are enclosed between these lofty ranges, on the north, and a lower range, at the base of which the Swampy flows. It is beautiful country, with splendid vistas in every direction, but especially towards the east, where Kosciusko forms the dominant feature.

NOTES FROM FIELD AND STUDY

[Members are invited to contribute paragraphs for this section of the *Naturalist*, which should become a popular miscellany. Original notes, of course, are most desired; but gleanings from scientific literature, unlikely to be seen by the majority of members, will also be welcomed.]

NEW BOOK ON INSECTS.

Dr. R. J. Tillyard's forthcoming book, "Insects of Australia and New Zealand," will be welcomed by entomologists overseas as well as those in Australasia. Though mainly a text-book for students, it will be of interest and value also to the "general" naturalist. It will contain about 500 pages (royal 8vo), with eight full-page plates in colour, and more than 350 other illustrations. All the illustrations will be reproduced from new drawings or from photographs made specially for the purpose. The economic aspect of insect life will be dealt with fully. Dr. Tillyard is Chief of the

Biological Department, Cawthron Institute, Nelson, N.Z. His work, "The Biology of Dragonflies," was recognised in Europe and America as setting a fresh standard for books of its class. His new work is being published by Messrs. Angus and Robertson Ltd., Sydney. The price will be about 30/-.

A WATER-SCORPION'S WAYS.

The habits of a Water-Scorpion (*Nepa rubra*) kept in a glass jar have greatly interested me. The insect was captured in February last at Mount Martha. The pond-water in the "aquarium" was frequently changed, and the tenant was fed upon blowflies (*Calliphora*), worms, small water-beetles and tadpoles. The later he caught for himself, with surprising skill. Water-Scorpions must be a veritable nightmare to other pond-dwellers! Our pet was particularly "nice" as regards personal appearance, and spent much time in combing and grooming his body with his long fore-legs. Meal-times were a long-drawn-out pleasure to him, and he would stay for hours with his sucking-beak imbedded in the body of his victim, until every particle of juice must have been extracted. *Ecdysis*. During three months of captivity the *Nepa* changed his coat twice. It was rather surprising to see, one morning, a "scorpion" almost double the size of the one we had been observing the night before, while the discarded "coat," looking exactly like its recent wearer, lay at the bottom of the jar. It was possibly a third "moult" that caused the insect's death on 25th May. I would be interested to hear from a student of pond-life who has noted more than two "moults" in *Nepa*.—E.C.

A DRAGONFLY THAT POSES.

In our garden at Mont Albert grows an English Broom (*Sarothamnus scoparius*), perched on a bank above the lawn. This, of late, has been the centre of some instructive entertainment on account of the curious habit of small dragonflies that have been resorting to it, one might think, for the purpose of "making believe." In late summer the air at times is full of small flies, and on these the Dragonfly, *Lestes leda*, Selys, apparently delights to feed. Coincidence or otherwise (we leave that to the argumentative), there are some dry valves of Broom pods extending at a wide angle from the stiff branches of the bush. *Lestes* flits to the Broom-tips and extends its body, with wings depressed, almost at right angles to the stem, and it is difficult, at a

short distance, to distinguish pods from dragonflies. The insects at brief intervals dart into the space around, and almost imperceptibly return with something in their jaws. The victims are tiny flies, which, in a few seconds, are sucked dry, when their remains fall to the ground; it reminds one of a parrot biting nuts and dropping the broken shells.—F. CHAPMAN.

VICTORIAN PLANTS IN SCOTLAND.

An item of interest to Victorian field naturalists is recorded in the 1924 Transactions of the Proceedings of the Botanical Society of Edinburgh. At the March meeting, among the plants in flower exhibited by the Royal Botanic Gardens were the Scarlet Coral Pea, *Kennedya prostrata* (R.Br.), Hairy Pink-eye, *Tetralthea pilosa* (Labill), while the West Australian *Kennedya nigricans* also was shown. Our Club is doing useful work in educating the public in regard to native flowers for the garden. It is not long since a Melbourne nurseryman, when urged to show more native plants in his window, replied: "I can always sell exotics, but when I name the Victorians as useful and beautiful, I have often met with a rebuff." The "Natives" are more popular now.—A.J.T.

A BOTANICAL "FIND."

Borya nitida, a little tufted plant with insignificant inflorescence, only a few inches high, belongs to the Johnsoniæ tribe of the dry-fruited series of our lilies. In the same section are *Stawellia*, of one species only, two *Johnsonias*, and two *Arnocrinums*, all confined to Western Australia; and the *Bartlingias*, six of which are also restricted to the western State, a seventh extending thence to New South Wales and Tasmania, and the eighth recorded only from this State, New South Wales and Queensland. The discovery by Mr. C. W. D'Alton of *Borya nitida* at Mackie's Peak, near Hall's Gap, in the Grampians, is, perhaps, one of the most interesting of our botanical "finds" in recent years. It is a far cry to Cape Arid, on the other side of the Great Australian Bight, the nearest point recorded for the plant in Western Australia—about 1200 miles in a bee line—and it is still further to Rockingham Bay, in Queensland—nearly 1700 miles—where the only other species in the genus is located. Bentham, finding only slight structural differences between this *B. septentrionalis* and its

western ally was, perhaps, constrained to state that it is "most distinctly separated by geographical position." It would thus appear that the Borya is really monotypic, and affords another very striking instance of the discontinuous distribution of certain of our plants, which is so closely connected with, and only explicable by the reading of, the physiographical history of the continent.—C.S.S.

"MAJOR MITCHELL" COCKATOOS.

None of the Cockatoos is more beautiful than the "Major Mitchell," *Cacatua leadbeateri*, and none more engaging, in the wilds or captivity. Pink Cockatoo is the vernacular name favoured for this species by the Check-list Committee of the Royal Australasian Ornithologists' Union. In many districts it is called "Wee Juggler" but to the majority of bird lovers and bush-folk it will always be the "Major Mitchell." Its popularity, as a handsome "talking" bird, has been its greatest misfortune. It is rare now in some parts, where formerly many broods were reared every season. From other localities it has disappeared, owing mainly to the advance of settlement. Trappers and nest-robbers are responsible for the decrease of *C. leadbeateri* in certain of its Victorian haunts that still remain wild. I have met with it, in pairs, in the Mallee country, and know that it nests in the Whyperfield National Park. Before that area became sanctuary for native fauna, the homes of cockatoos and parrots were raided freely by trappers and other persons. The young bird shown in the photograph (see plate) was one of three born in a Gum-tree hollow, up Whyperfield way. It was posed for the portrait, and displayed its resentment just as the camera shutter was released.—C.B.

MOSQUITOES OF AUSTRALIA.

The mosquito fauna of Australia and the adjacent islands, including Tasmania, is represented by about 100 known valid species, some of which extend into New Zealand, New Guinea and the Oriental region. Of these species, only six are included in the *Anopheles* group. The actual number of indigenous species is probably considerably larger, since only a comparatively small area of the continent has been systematically searched for these insects. Our knowledge of the early stages and breeding habits of even the commoner species is very incomplete, and much useful research in this direction remains to be done. Of the seventeen species known from

Victoria, only one is restricted in its range to this State, and, although common, nothing is known of its life-history. Two of the most abundant species, i.e., *Aedes camptorhynchus* (Thoms.) and *Aedes alboannulatus* (Macq.) which are found also in the adjoining States, rival some of the northern species as pests in swamp and bush localities, while another, *Anopheles annulipes* (Walk.), with a still wider Australian distribution, is of importance as a possible, if not an actual, carrier of malaria in the northern States. Of the purely domestic species, the ubiquitous *Culex fatigans* (W.) is probably the best-known and most troublesome indoors. As it rarely breeds elsewhere than in contaminated, stagnant water near habitations, its scarcity, or abundance, is a fairly accurate index to the sanitary condition of the vicinity.—G.F.H.

BIRDS OF A SUBURBAN GARDEN.

A few gum trees will attract native birds around the suburban home. Where I live, at East Malvern, many of the original Eucalypts are standing, and, as a result, we are never without a bevy of indigenous birds, to say nothing of the introduced species. In my neighbour's yard a pair of Black-and-white Fantails, *Rhipidura leucophrys*, last season reared a brood of two. The young birds have gone elsewhere, but the parents we still have with us. Every evening four sedate Kookaburras, *Dacelo gigas*, perch in my Wattle trees for a while before going to roost, and are delighted when I provide them with a meal—scraps of meat. So tame is one that I have no difficulty in approaching within two or three yards of it. A pair of Shrike-tits, *Falcunculus frontatus*, we have had as tenants for several months. They spend most of their time "prospecting" the crevices in the bark of the gums for lurking insects. Of White-plumed Honeyeaters we have quite a flock, and several young birds were reared in the street last season. Nothing pleases them more than to pester the Kookaburras; they are always assisted by the Fantails and a pair of Blackbirds. The Fantails, however, are the most courageous; frequently they alight on either the head or the back of a Kookaburra, and remain for perhaps a minute. When a black cat one day was walking along the top of a paling fence, the Fantails alighted upon its back, and enjoyed a ride for ten yards, scolding their victim vigorously the while. The cat stopped several times, and arched its back, but its footing was so precarious that it could not dislodge the birds. In the

early morning, a pair of Magpies, *Gymnorhina hypoleuca*, and two or three Magpie-larks, *Grallina cyanoleuca*, are seen hunting for food in our back garden. Recently (April and May) the autumn notes of the Grey Butcher-bird, *Cracticus torquatus*, have been heard. A pair of welcome Swallows, *Hirundo neoxena*, spend most of their resting-time sunning themselves on the house telephone wires. A small family of Blue Wrens, *Malurus cyaneus*, resides in the street, and on rare occasions visits our garden. Often at night we hear the monotonous call of the Boobook Owl, *Ninox boobook*. When the Eucalypts were blooming, about Christmas-time, the harsh call of Red Wattle Birds, *Anthochaera carunculata*, were heard all day long, and frequent squabbles between these birds and the White Plumed Honeyeaters, *Meliphaga penicillata*, took place. The Bronze Cuckoo, *Chalcites basalis*, and the Fantailed Cuckoo, *Cacomantis flabelliformis*, have each paid us one visit only. A flock of nine Rosellas, *Platycercus eximius*, flew over one morning, and on another occasion a pair of Galahs, *Cacatua roseicapilla*; the latter birds, probably, had escaped from a local aviary.—F.E.W.

BIRDS AND BUTTERFLIES.

It is not unusual to see insectivorous birds capturing moths; indeed, certain species prey upon them freely, especially in the nesting season. But what proof have we that birds are more than "casual" enemies of butterflies, that they have been concerned in the matter of mimicry?

Some opponents of the theory that distasteful butterflies are mimicked by other species lacking that form of protection, contend that birds have no special liking for diurnal Lepidoptera. Further, they declare that, when butterflies are hunted by birds, no choice, apparently, is exercised; "pleasant" and "distasteful" forms alike are taken indiscriminately. The subject has been a debatable one for years, and every bit of evidence is worth recording.

Dr. H. Eltringham, in his book, "Butterfly Lore," gives an excellent summary of facts and theories in respect of this subject. "The degree to which a butterfly may be destroyed and eaten by its enemies," he writes, "depends on the state of the destroyer's appetite for the time being. A very hungry bird will eat certain kinds of butterflies which, less

ravenous, it will promptly refuse." "All manner of factors," Eltringham adds, "will affect the result."

When butterflies are unusually abundant in their haunts, some birds will certainly take heavy toll of them; while in a normal season few may be taken. Last summer, butterflies of several species were so plentiful around Melbourne and the nearer hill country that one might see thousands almost at a glance in the most favoured localities. It was so at Eltham, in December and January, and some birds, at least, were butterfly hunters every day. Early in January, Mr. W. C. Tonge observed a pair of Leaden Flycatchers, *Myiagra rubecula*, feeding their young in the nest chiefly upon Common Brown Butterflies, *Heteronympha merope*, "jamming them into the little beaks, wings and all." The diet was varied with a few dragonflies. Doubtless, many broods in Eltham and other districts were reared largely upon butterflies last season.

Respecting the Wanderers, *Danaida archippus*, Anderson and Spry state: "They feed quite openly, having no fear of birds on account of a noxious smell they emit." ("Victorian Butterflies," p. 43.) The species of the sub-family, *Danainæ*, are all "protected" like the Wanderer, and they have many mimics, it is claimed, among "unprotected" species of other sub-families. In Australia, and also in Egypt, I have seen large numbers of *Danaine* butterflies where birds also were plentiful, but I have no record of one of these "distasteful" insects being attacked by birds.

Danaine butterflies are slow in flight, and birds could capture them easily. Their immunity from attack, then, apparently, is due to their distastefulness.—C.B.

When walking through the bush at Eltham on 5th October, 1924, I noticed a female Rosella Parrot, *Platycercus eximius*, fly up from a rotting tree-stump. A hollow had been cleaned out on the ground within the stump, and on the 8th the bird was there, sitting on three fresh eggs. Rain had fallen recently, and the Parrot's nursery was damp. On the 10th it was wet and deserted, more heavy rain having fallen in the interim. A few years ago, in a neighbouring paddock, five or six young Rosellas, fully fledged, were found in a rabbit burrow.—W. C. TONGE.

Field Naturalists' Club of Victoria

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EXCURSIONS.

SATURDAY, 18th JULY.—Mt. Morgan, Belgrave. Object: Heath.
Leader: Mr. F. Pitcher. Meet at Flinders St. Station for
8.50 a.m. train. Week-end tickets to Belgrave. Lunch should
be taken.

SATURDAY, 1st AUGUST.—Mitcham. Object: Heath. Leader:
Mr. F. G. A. Barnard. Meet at Flinders St. Station for 1.30
p.m. train.

PHOTOGRAPHS FOR THE NATURALIST.

It is proposed, while funds permit, to include one plate at
least in each issue of the *Naturalist*. Members are invited to
submit prints for consideration by the Editor and the Publishing
Committee. Unusual subjects are desired, not photographs of
scenery, etc. Writers of papers might submit photographs suitable
for illustrations.—Editor.

All contributions for the *Naturalist*, and letters to the Editor,
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THE JOURNAL AND MAGAZINE

— OF —

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Published 10th July, 1925

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING MONDAY EVENING, 13th JULY, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—

Mrs. G. Coghill,
17 Monomeath Avenue,
Canterbury.
Mr. A. R. Mills,
430 Little Collins St.,
Melbourne.

PROPOSER.

Mr. G. Coghill.

SECONDER.

Mr. C. A. Lambert.

Miss Willson.

Mr. C. Oke.

AS COUNTRY MEMBER—

Mr. F. S. Mann,

Caramut.

Mr. P. R. H. St. John.

Mr. F. Pitcher.

AS ASSOCIATE MEMBER—

Master Colin Keith Fraser,
Charles Street,

Kew.

Master Ronald Ian Wallace,
c/o Prof. Wallace,

Kew.

Mr. A. D. Hardy. Mr. F. G. A. Barnard.

Mr. A. D. Hardy. Mr. F. G. A. Barnard.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. By Mr. J. C. Goudie—"Notes on the Coleoptera of North-Western Victoria" (Part XIII).

2. By Mr. T. S. Hart, M.A.—"Victorian Species of Cassytha."

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

Subscriptions for the year 1925-26, at the new rate, became due on May 1:—Ordinary Members, 20/-; Country Members, 12/6.

SPECIAL NOTICE.—The attention of members is directed to item 8 of business paper. Notices of exhibits should, if possible, be type-written.

The Victorian Naturalist

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JULY 10, 1925.

No. 499.

FIELD NATURALISTS' CLUB OF VICTORIA.

The annual meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, June 15, 1925. The President, Mr. J. Searle, occupied the chair, and 105 members and friends were present.

CORRESPONDENCE.

From Hon. Secretary Victorian Horticultural Society, inviting members of the Club to a lecture, entitled "Our Eucalypts," by Mr. W. Russell Grimwade, to be given in the Horticultural Hall on June 18.

REPORTS.

1. A report of the excursion to the Biology School, University, on Saturday, May 30, was given by the leader, Miss J. W. Raff, M.Sc., who said that 25 members had met in the Zoology Laboratory. The subject dealt with was "Useful Zoology," and attention was confined to those forms of Invertebrata that are of use to man, both directly and indirectly. Various specimens and preparations illustrating these were exhibited, and members examined them with interest.

2. A report of the excursion to Mt. Evelyn, on King's Birthday, was given by the leader, Mr. C. Oke, who said that a party of 18 members had spent a very pleasant day in the hills.

ELECTION.

On a ballot being taken, the following were duly declared to be unanimously elected as ordinary members of the Club:—Mrs. F. Pitcher, "Freehencourt," Punt Hill, South Yarra; Mr. G. F. Hill, National Museum; Mr. W. E. Jones, 28 Clyde Street, South Yarra; Mr. A. S. Robertson, 22 Mayfield Avenue, Malvern.

GENERAL.

The Hon. Secretary read the 45th Annual Report. Mr. C. A. Lambert moved that the report be received and adopted. Seconded by Mr. F. Pitcher, and carried.

The Hon. Treasurer read the 45th Annual Statement of Receipts and Expenditure, and drew attention to the following points of interest:—

Subscriptions differ by only 5/- from those of the previous year. Proceeds from sales of *Victorian Naturalist* have increased from £2/7/9 last year, to £21 this year, owing to the zealous efforts of the Hon. Librarian. Wild Flower Show profits, £118, as compared with £107 last year. Various economies have brought about a reduction of £91 for the year in the cost of the *Naturalist*, and of £12 in general printing.

The Statement was received and adopted, on the motion of Messrs. G. Coghill and L. Hodgson.

Mr. Hooke moved a vote of thanks to the Auditors. Seconded by Mr. H. B. Williamson, and carried.

ELECTION OF OFFICERS AND COMMITTEE.

There was only one nomination for the office of President, and Mr. Geo. Coghill was declared duly elected. Mr. A. E. Keep asked that his name be removed from the list of those nominated as Vice-Presidents. The ballot resulted in the election of Messrs. F. G. A. Barnard and E. E. Pescott, F.L.S. The following (unopposed) were declared duly elected:—Hon. Treasurer, Mr. A. G. Hooke; Hon. Librarian, Dr. C. S. Sutton; Hon. Editor, Mr. C. Barrett, C.M.Z.S.; Hon. Secretary, Mr. C. Oke; Hon. Assistant Secretary and Librarian, Mr. H. B. Williamson, F.L.S. Messrs. Hughes, Lambert and Pitcher requested that their names be withdrawn from the list of members nominated for the Committee. The ballot was then taken, and the following were elected:—Messrs. F. Chapman, A.L.S., C. Daley, B.A., F.L.S., J. A. Kershaw, P. R. H. St. John and F. E. Wilson, F.E.S.

Mr. A. J. Tadgell moved that a hearty vote of thanks be accorded to the officers and committee for their labours during the past twelve months. Seconded by Mr. A. L. Scott, and carried.

BOTANIC GARDENS.—Mr. F. G. A. Barnard moved “That this Club views with alarm the proposal to alienate portion of the Botanic Gardens for the purpose of a tramway, and desires the Committee to forward a strong protest to the Minister for Lands, and the Town Planning Commission. Seconded by Mr. Oke, supported by Messrs. Pitcher and Searle, and carried.

SPECIAL MINUTE.—The following minute was read, and adopted with acclamation:—"That the Committee and members of the Field Naturalists' Club of Victoria desire to place on record in the minutes of the Club their hearty appreciation of the continued and efficient services of their fellow-member, Mr. F. G. A. Barnard, in various offices of the Club during 45 years of loyal and active membership, and especially in connection with the Editorship of *The Victorian Naturalist*, in which responsible office Mr. Barnard has unselfishly given 32 years of capable and distinguished service. The general wish is expressed that Mr. Barnard may be long spared to continue his interest and career of usefulness in the Club's work."

ADDRESS—An address on "The Life and Work of Baron von Müller" was given by Sir Baldwin Spencer, to mark the centenary of the birth of the Baron. Mr. G. Coghill proposed a vote of thanks to Sir Baldwin for his most interesting address. Seconded by Mr. H. B. Williamson, and carried with acclamation.

Mrs. E. Coleman and Messrs. F. Pitcher, A. D. Hardy, J. Searle and H. B. Williamson spoke briefly of Baron von Müller and his work.

ANNUAL REPORT.

The Hon. Secretary, Mr. C. Oke, read the forty-fifth Annual Report, 1924-25, as follows:—

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentlemen—

"In presenting the forty-fifth report, for the year ended April 30, 1925, the Committee desires to thank members for the hearty support received from them during the period, and to congratulate them on the continued success of the Club. During the year 20 ordinary, 2 country and 2 associate members have been elected, while the resignations number 14, and 4 deaths have occurred, leaving a total membership of 244."

"With deep regret, we have to record the deaths of four members. Mr. J. B. Walker, who died in June from injuries he received in a street accident, at one time regularly attended our meetings, but of late years very seldom appeared. As our printer, for many years, he displayed great interest in the *Naturalist*, and spared himself no

trouble to give us a first-class journal. The death of one of our associate members, Master S. J. Walker, who was developing a love for natural history, also occurred in June. In October, Mr. L. B. Thorn, a member of the Committee, died after a very short illness. Mr. Thorn was well known to members as a collector and a student of butterflies and moths. He was an enthusiastic worker for the Club's good, whose loss we much regret. Also, in October, the Club lost one of its oldest members in Mr. G. R. Hill, who was elected in 1884, and had acted as a member of the Committee for two years.

"The monthly meetings have been held regularly, and have been well attended, as usual, the average attendance being 50-60 members and friends. Thirteen papers have been read and three lectures delivered, all both interesting and instructive. They were contributed by the following members:—Dr. W. MacGillivray, Messrs. J. C. Goudie, P. F. Morris, L. B. Thorn, C. Daley (Presidential address and papers), A. J. Tadgell, F. Pitcher, J. Stickland, J. H. Harvey, A. L. Scott, E. E. Pescott and C. French, Jun., and C. W. D'Alton. The most of the papers have been published in the *Naturalist*. It is a pity that more discussion does not follow the reading of some of our papers, as nothing could add more to the general interest of a paper than to hear it discussed by members having, perhaps, divergent views on the subject.

"The excursions are as popular as ever, and most of them have been very well attended. A number of short Saturday afternoon trips have been made to places around the metropolis, and whole-day trips to Hurstbridge, Beaconsfield, Wandin, Brisbane Ranges, Mornington, Ferntree Gully, and Clematis; more extended trips were those to Bendigo and Wilson's Promontory.

"The annual Exhibition of Wild Flowers was held in the Melbourne Town Hall on Tuesday, October 21, and was opened by Sir James Barrett. Although it was rather late in the season, a very fine display of flowers was staged by a number of capable workers, to whose energy the success of the show was due. The Committee desires especially to thank all who helped on that occasion. The financial result of the show was a profit of £118, and of this amount £55 was given to the Victorian Bush Nursing Association. In returning thanks for the donation, the Association invited the Club to

nominate two members as Life Governors of the Association, and the Committee has recommended Mrs. E. Coleman and Miss A. Fuller.

"It is always a pleasure to see our members' names in the University Graduates' List, and this year we have to congratulate Mr. P. C. Morrison on taking the degree of Master of Science.

"The forty-first volume of *The Victorian Naturalist* has been completed, and once again the Club is greatly indebted to Mr. F. G. A. Barnard for the capable way in which he has edited our journal. To the regret of everyone, Mr. Barnard tendered his resignation as Hon. Editor, in February, as from the end of Vol. XLI. Although very loth to accept the resignation, the Committee recognised that, as Mr. Barnard had done more than his share for the Club, it was only right that he should be relieved of the editorial work, after 32 years' service. At the March ordinary meeting Mr. C. Barrett was nominated as Editor. No other nomination was received, and Mr. Barrett was declared unanimously elected.

"The Committee had under consideration the high cost of printing the *Naturalist*, and as the printers could not reduce their charges, it was decided to obtain quotations from several other firms. As a result, in September the printing of our journal was transferred to The Ramsay Publishing Pty. Ltd. The cost of producing the *Naturalist* now is lower than hitherto.

"Your Committee has given its co-operation to several measures for the preservation of our fauna and flora in various localities throughout the State.

"The Hon. Treasurer reports that the receipts for the year amounted to £399, and the expenses to £337, leaving a credit balance of £62.

"The Hon. Librarian reports that he has thoroughly overhauled the Library, rearranged it, and brought the card catalogue up to date. Efforts to fill the numerous gaps in our files have met with such success that, with very few exceptions, the sets of publications being received by us are now complete. In all, 201 missing volumes and parts have been obtained. Only 27 of these were purchased, at a cost of £6/5/-. The remainder have been donated; and the very best thanks of the Club are due to the various Societies concerned for their generosity. The sum of £10/15/6 was spent in bookbinding, but a much greater amount must be devoted to

this purpose, before even the more important literature on our shelves is bound in volumes.

"The Committee desires to express its thanks to Messrs. Coghill and Haughton for the use of rooms for Committee meetings. The attendance at the fourteen Committee meetings held during the year has been as follows:—Messrs. Searle and Oke, Dr. Sutton, 14; Mr. Williamson, 13; Mr. Stickland, 12; Messrs. Barnard, Rodda and Wilson, 10; Messrs. Cudmore and Daley, 9; Messrs. Coghill, Hooke, and St. John (elected in November), 7; Messrs. Kershaw (away through illness) and Thorn (died in October), 4; Mr. Barrett (elected in March), 3.

"In conclusion, your Committee desires to express its gratification at the way in which its efforts on behalf of the Club have been supported by the members, and trusts that the same support will be given to the incoming Committee.

"On behalf of the Committee,

"(Signed) J. SEARLE, President.

"C. OKE, Hon. Sec."

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Works by Baron von Müller, and six species of Australian plants described by him during the years 1853-5: *Grevillea confertifolia*, *G. victoria*, *G. pterosperma*, *G. Miqueliana*, *Hakea rostrata*, and *Banksia ornata*.

By Mr. F. G. A. Barnard—Pamphlet: Reprint from *Extra Essays on Australian Vegetation*, 1866," presentation copy to Sir George Stephen; lecture delivered at the Public Library, 1871, on *Forestry*, by Dr. Von Mueller; and personal letter from him.

By Mr. Geo. Coghill—Letters from Baron von Mueller, 1884-5; also plants from Phillip Island identified by the Baron, in his own handwriting, 1886.

By Mrs. E. Coleman—(1) Collection of ferns made by Baron von Mueller, in the possession of Miss D. Kidd, St. Kilda; (2) *Pterostylis vittata*, from Black Rock, 15/6/25; (3) *Corysanthes bicalcarata*, from Healesville, 15/6/25; (4) Water-scorpion, with two discarded skins.

By Mr. F. Chapman, A.L.S.—*Hakea laurina*, grown at Balwyn, on silurian mudstone; tree about eight years old.

By Mr. C. Daly, B.A., F.L.S.—Two portraits of Baron von Mueller, and works by the Baron, from the National Herbarium Library.

By Mr. E. E. Pescott, F.L.S.—Portrait of Baron von Müller, 1865; photograph of Maurice Heuzenröder's shop, in Adelaide, in which the Baron worked; letter from Becker, the explorer, written to von Müller, 9/3/60; von Müller's list, in his own writing, of his last exhibits at the Field Naturalists' Club, September, 1896; letters (1896) from the Baron to Mr. C. French, Jun.; and other items.

By Mr. J. A. Kershaw—Ringed snake (*Furina occipitalis*), swallowing Blind Snake; from Pachewillöck, Victoria.

By Mr. E. McLennon—Private interleaved copies of the last and second last editions of Baron von Müller's *Select Extra Tropical Plants*, with annotations and emendations. The last set of annotations has not been published.

By Mr. V. Miller—Double "Coco-nut" or Coco-di-ma, *Lodiocera seychellensis*; also cut and uncut stones from the Barcoo River, Central Queensland.

By Mr. A. E. Rolda—Bean pods and segments of Pandanus fruit, from North Queensland.

By Mr. J. Searle—Photograph of Dr. von Müller as a young man.

FIELD NATURALISTS' CLUB OF VICTORIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR TWELVE MONTHS ENDING 30th APRIL, 1925.

Receipts.

To Balance in London Bank on 1st May, 1924	£5	16	7
" Subscriptions—			
Town Members:			
Current year	£105	0	0
Arrears	17	12	6
In advance	4	12	6
Country Members:			
Current year	17	15	0
Arrears	5	0	0
In advance	2	12	6
Associate Members	0	12	6
	<hr/>		
	£153	5	0
" "Victorian Naturalist"—			
Subscriptions	8	17	6
Cash Sales	21	0	10
Advertisements	4	0	0
Reprints Charged	3	2	10
	<hr/>		
	37	1	2
" Donations to Publishing Fund	7	8	0
" Interest from Savings Bank and War Loan Bond	11	9	4

To Sale of Club Badges	0	5	0		
„ Char-a-banc Excursion	4	3	0		
„ Plant Census Account—					
Sale of books in year	16	8	4		
„ Wild Flower Exhibition, Octo- ber, 1924—					
Ticket Sales	£27	8	0		
Cash at doors	83	1	0		
Sale of Plants, Flowers and Refreshments	59	3	2		
				169	12 2
					399 12 0
					£405 8 7

Expenditure.

By "Victorian Naturalist"—

Printing	£154	5	2		
Illustrating	17	8	7		
Wrapping, Despatching and Postage	20	1	6		
Reprints—free	7	10	0		
Reprints—charged	1	3	0		
				£200	8 3
„ General Printing				11	14 6
„ Library Account—					
Periodicals and Books Purchased		5	1	6	
„ Rent of Hall, and Fee to Caretaker		13	10	0	
„ Postage, Advertising, Bank Charges, Insur- ance, and Sundries		10	4	1	
„ Char-a-banc Excursion		5	10	0	
„ Plant Census Account		3	7	6	
„ Wild Flower Exhibition, Octo- ber, 1924—					
Charges at Melbourne Town Hall	£6	3	6		
(Hire of Hall, paid in pre- vious year, £18)					
Purchase of Plants and Flowers	13	5	0		
Printing and Advertising	8	7	6		
Cartage, Freight and Sun- dries	5	2	4		
Donation to Bush Nursing Association	55	0	0		
(Balance retained in Funds of Club, £63/13/10)				87	18 4
„ Amount withdrawn to increase Savings Bank Deposit to £150	38	10	8		
Add Interest accrued	11	9	4		
				50	0 0
					£387 14 2
„ Balance in London Bank on April 30, 1925				17	14 5
					£405 8 7

STATEMENT OF ASSETS AND LIABILITIES ON 30th APRIL, 1925.

Assets.

Arrears of Subscriptions, £70/10/6, estimated to realise, say	£50	0	0
War Loan Bond	20	0	0
London Bank Balance	17	14	5
State Savings Bank	150	0	0
Library and Furniture (Insurance Value)	130	0	0
Plant Census Account (difference between cost and sales of books)	168	4	8
Accounts owing to Club—			
For Advertisements in "Victorian Naturalist" £4 10 0			
For reprints charged 3 19 9			
		8	9 9
	£544	8	10

Liabilities.

Subscriptions paid in advance	£7	5	0
Balance of Char-a-banc Fund	5	6	0
Outstanding accounts—Nil.			
		£12	11 0

Examined and found correct on 1st June, 1925.

L. L. HODGSON	}	Hon. Auditors.
J. R. LESLIE		

A. G. HOOKE,
Hon. Treasurer.

NATIONAL MUSEUM NOTES.

SNAKE SWALLOWING SNAKE.—A Ringed Snake, *Furina occipitalis*, recently forwarded to the National Museum by Mr. G. Patullo, was taken in the act of swallowing a Blind Snake, *Typhlops*. When found, the head and part of the Blind Snake was in the mouth of the Ringed Snake, but was disgorged. After capture the *Furina* again commenced to swallow its prey, and had already ingested the head and fore part of the body when it was killed. Both the *Furina* and *Typhlops* were of medium size. They were taken at Pachewillock, Victoria, in February last.—J. A. KERSHAW, Curator.

CORRECTION.—*Naturalist*, May, 1925, p. 32, fourth line from bottom. "December, 1902," should read December, 1892.

THE ANTS OF VICTORIA.

BY J. CLARK, F.L.S.

[Part I.]

Probably the most interesting, and neglected, group of insects is the large family of ants, *Formicida*. This great continent is very rich in large and peculiar species, which are not found elsewhere, yet little or nothing is known concerning them. The habits and life history of even our commonest forms are unknown. This is the more unfortunate because, with the advance of settlement, the natural bush, gradually, is becoming cultivated land, and the ants, like many other native animals, slowly, but surely, are disappearing. Before it is too late, it would be well to learn all we can of these insects; even now, some species, which are very local, have become extremely rare.

The difficulty attached to the study of Australian ants has always been the lack of popular literature on the subject; unfortunately, such literature does not exist. Most of our ants have been described in various scientific journals, published in German, French and Italian. To the average nature lover, these records are uninteresting, since they are technical descriptions of the ants. They are, of course, essential, from a scientific point of view, but make little appeal to one bent on the study of ants in the bush.

Books published in Australia contain very little concerning ants. The best of them is *Australian Insects*, by W. W. Froggatt, published in 1907. In 1905, the same zealous entomologist published a catalogue, with notes on a few species, of the Australian ants. Mr. H. Tryon, in 1888, published some notes on Queensland ants, in the *Proceedings of the Royal Society of Queensland*. To the *Victorian Naturalist*, in 1903, E. E. Barker contributed a good paper on Bull-dog Ants; F. P. Dodd contributed interesting notes to the same journal, in 1902. The most useful book on ants in general is that by Professor W. M. Wheeler, entitled *Ants: Their Structure, Development and Behaviour*. It is published by the Columbia University Press, New York, U.S.A.

Some quaint and weird stories, particularly in connection with our Bull-ants, will be found in literature published overseas. Sharp (1899) writes that the nests are "said to be sometimes five feet high." This surely must apply to Termites' nests. Bull-ants will climb anywhere; and it is possible that a stranger, seeing huge ants on a high mound, might conclude that they were the owners. Probably the quaintest story regarding our Bull-ants, is that recorded by Smith, in the Proceedings of the Linnean Society of London (1861), from details supplied to him by Mrs. Hatton, of Sydney. The "funeral rites" of the soldier-ants are described. This has been dealt with in the *Victorian Naturalist*, by Barker.

I have kept Bull-ants in captivity for some years, and find that, far from showing sympathy with the injured, or the dead, they throw them on the rubbish-heap, where gradually they become covered in the refuse from the nest. In the bush, other ants would certainly carry such bodies to their nests, and it is possible that Mrs. Hatton noticed some species of *Camponotus*, several of which look much like Bull-ants to the casual observer, carry the dead Bull-ants to their nests, which frequently are indicated only by holes on the surface of the ground. When food is being taken to the nest in abundance there are generally a few ants around the entrance; this may have suggested the "funeral."

In an article in *The Entomologist* (1865), B. T. Lowne dealt with a number of ants seen and captured during a two-months' visit to Sydney, in 1862. Some of his notes are good; but in several cases his observations do not tally with those of Australian observers. In dealing with *Myrmecia gulosa*, one of the commonest Bull-ants, he says:—"These ants are the most rapacious and numerous of Australian species; they climb trees in vast numbers, to attack the great *Anoplognathi*, which they pull down and bury alive in the earth; although, in point of bulk, the beetles bear very much the same relation to the ants that an elephant does to a man. I have, however, often seen three ants bring one of the largest to the ground in spite of all its exertions. Their sting is very severe, but the pain occasioned is evanescent." In dealing with *Myrmecia nigrocincta*, he says:—"This insect is remarkable for the leaps it takes in running, often jumping over a foot of ground at a leap; it also jumps from the trunks of trees upon persons walking near it. Its sting is very severe."

Bull-ants do climb trees, and they will attack anything and everything that comes in their way, but why they should pull down and bury the beetles alive is a mystery that Lowne does not explain. There is no reason whatever for such action. From my own observations, these ants carry home every insect they capture; but the victims, as a rule, are honey-bees, and other soft-bodied insects, taken to feed the larvæ in the nest. I have never known adult Bull-ants to eat animal food; they always prefer the nectar of blossoms and the exudation of trees, shrubs, etc. In my artificial nests the food supplied is honey, sugar in various forms, and cake of all sorts, with plenty of water each day; also a quantity of insects and caterpillars for the larvæ. Although the adult Bull-ant is really a honey-eater, the larvæ must have an insect diet, or they will eat one another when close together. On more than one occasion, when the food supply was overlooked, I found that one larva had apparently been supplied as food to other two by the ants; and several times weak, or injured, ants have been served to the larvæ. When the larvæ have finished their feeding on the insect body, its remains are carried outside the nest to the rubbish-heap, where, in the bush, they are promptly removed by other ants. Thus, a Bull-ants' nest very rarely shows signs of food remains, either inside or out.

Lowne's observation, that these ants jump from trees on to a person, is quite correct, as most bush lovers know; but the statement that the Jumper, *nigrocincta*, can jump over a foot of ground requires verification. I have not seen one jump more than four inches, and that is more than twice the usual length of the Jumper's "leap."

Apart from the Bull-ants, there are many species that will reward study, such as the Harvesting Ants, which collect, and store in their nests as food, seed of various plants, including grasses. Very little is known concerning "Harvesters" in Australia. In other parts of the world, there are Fungus-growing Ants. These insects strip the leaves off trees to make the beds on which they raise the fungus. So far, this habit has not been discovered in any Australian species.

The nests of most ants contain numbers of other insects, mostly beetles. Although numbers of these insects have been collected in Australia, we possess only meagre knowledge concerning them, or the reasons for their presence in the nests

with the ants. Myrmecophiles, and their habits, offer a wide field to the entomologist.

The study of ants is most interesting, and entails very little exertion. It should appeal to those whose health does not allow of vigorous work in the bush. It keeps the observer in the open, with his mind fully occupied, so that life's worries are soon forgotten, while a store of valuable information is gained. Ants are numerous everywhere. They are easily kept in artificial nests, and make interesting pets. The food required by them is always at hand, and the nests are readily made; so that no one should experience much difficulty in keeping ants for observation at home.

At present a bare list of the ants found in Victoria would not be very useful, so I propose to give a detailed list of the various forms, with references to the literature, and notes where possible. The literature is very scattered; besides, much of it is now unobtainable and deals only with the descriptions of the species. Inclusion of references to the literature is the more necessary from the fact that Froggatt's catalogue gives only some 30 species as found in Victoria, whereas, thanks to my many entomological friends, I have been able to see several times that number from this State. Of course, it must be borne in mind, that a number of the early workers considered "Australia" as sufficient indication of locality, so that many in Froggatt's list should be treated as Victorian species.

The compilation of this paper has been rendered possible through the assistance I have received from entomologists in Victoria, particularly from Mr. J. A. Kershaw, through whose courtesy I have been able to examine the ants in the National Museum, Melbourne, and Mr. J. C. Goudie, who has gone to great trouble to send me the ants of North-Western Victoria; Messrs. C. Barrett, H. W. Davey, F. E. Wilson, G. F. Hill, and W. F. Hill, have collected extensively, and sent me a considerable number of new and interesting species. Recently Mr. C. Oke has sent some interesting species; while to the energy and enthusiasm of the late Mr. L. B. Thorne I owe much valuable material and information. I am greatly indebted to these friends for their assistance.

Family FORMICIDÆ.

Sub-family DORYLINÆ, Leach.

This sub-family is not at present represented in the fauna of Victoria. Only three species are recorded for the whole of

Australia, and of these two are from Mackay, North Queensland, and one from Lismore, New South Wales.

Sub-family CERAPACHYINÆ, Forel.

Wheeler, Psyche, vol. XXVII, 2-3, p. 50, 1920;
Proc. Amer. Acad. Arts. Sc., 53, pp. 215-265, 17
figs., 1918.

Clark, Jour. Roy. Soc., W. Aust., vol. IX, pt. 2, pp.
72-89, 10 figs., 1923; vol. X, pp. 75-89, pls.
VI-VII, 1924.

This sub-family is well represented in Australia, about two-thirds of the known forms having been described from this country. At present they are poorly represented in Victoria. Only four species have been found, and these had previously been recorded from other States. No doubt many more will be discovered when the study of this interesting group is undertaken by local entomologists.

Genus *Eusphinctus*, Emery.

In this genus the abdomen is elongate and cylindrical, the segments are separated from each other by well-defined constrictions; the workers are eyeless, or with very minute eyes. This genus contains two subgenera, based on the number of antennal joints, these in *Eusphinctus* s.str. being 11-jointed, while in the other sub-genus, *Nothosphinctus*, they are 12-jointed. These are rare ants, generally found in small communities, under logs and stones. Wheeler considers that they are hypogæic; their nests and habits certainly suggest that they are so in Western Australia, where I found one colony foraging in the bush among half-buried logs. At present very little is known concerning their habits.

1. *EUSPHINCTUS STEINHEILI*, Forel. Belgrave
(F. E. Wilson).

Sphinctomyrmex (Eusphinctus) Steinheili, Forel,
Ann. Soc. Ent. Belg., 44, p. 72, 1900, ♀ (nec. ♂):
Emery, Gen. Insect. Fasc. 118, p. 7, 1911; Frog-
gatt, Agric. Gaz., N.S.W., p. 15, 1905.

Sphinctomyrmex (Eusphinctus) fallax, Forel:
Ann. Soc. Ent. Belg. 44, p. 73, 1900, ♂.

Eusphinctus (Eusphinctus) Steinheili, Forel.
Wheeler, Proc. Amer. Acad. Arts & Sc., 53, 3, pp.
225-228, figs. 1-2, 1918.

A specimen from Belgrave agrees perfectly with the description of this species. It is a small, reddish-brown ant.

PLATE II



STRIPED GREENHOOD.
Pterostylis reflexa, R.Br.



BRITTLE GREENHOOD.
Pterostylis truncata, Fitz.

(Negatives by W. H. Nicholls)

barely one-quarter of an inch in length. It has no traces of eyes. This ant is also found in Queensland, New South Wales, and South Australia.

2. *EUSPHINCTUS STEINHEILI*, Forel, var. *HEDWIGÆ*, Forel. Ferntree Gully (F. P. Spry).

Sphinctomyrmex (Eusphinctus) fallax, var. *hedwigæ*, Forel, Rev. Suisse, Zool. 18, p. 21, 1910, ♂ ♀ ; Emery, Gen. Insect. Fasc. 118, p. 7, 1911. Bull, Lab. Zool. Gen. Agrar. 8, p. 179, 1914.

Sphinctomyrmex hedwigæ, Forel, Froggatt, Agric. Gaz. N.S.W., p. 15, 1905. Aust. Insects, p. 92, 1907.

Eusphinctus (Eusphinctus) Steinheili, var. *hedwigæ*, Forel. Wheeler, Proc. Amer. Acad. & Arts & Sc., 53, 3, p. 228, 1918.

Several examples of this variety, in the collection of the National Museum, were found under stones at Fern-tree Gully, by the late Mr. F. P. Spry, and noted by him as rare. It is very close to the preceding species, and, apart from colour, which is more uniformly reddish, it is not easily distinguished from that species.

Genus *Phyracaces*, Emery.

The ants of this genus are most interesting, and may be regarded as the Foraging Ants of Australia. 35 species are known from all parts of the continent, but concerning their habits we have little information. Wheeler has published some notes on species from New South Wales, in his paper, published in 1918; and I have given a few notes on Western Australian species. From the notes so recorded, it is evident that the members of this genus obtain the most of their food supplies by raiding the nests of other ants, and carrying off the larvæ and pupæ to their own nests, where they are served as food to the *Phyracaces* larvæ.

In some cases the female is fully winged, as in most female ants; but in many cases the female is ergatoid, or worker-like, hardly to be distinguished from the workers except by her larger size. In other cases, the female has the thorax fully developed, but bears no wings. Even in the winged forms, the wing venation is more or less obsolete. Only two species have, so far, been found in Victoria, and both were previously recorded from New South Wales.

3. *PHYRACACES LARVATUS*, Wheeler. Ferntree Gully (F. P. Spry); Beaconsfield, Belgrave (F. E. Wilson).

Wheeler, Proc. Amer. Acad. Arts & Sc., 53, 3, p. 257, fig. 15, 1918, ♀.

Clark, Jour. Roy. Soc., W. Aust., X, p. 83, pl. 7, figs. 1-6, 1924, ♀ ♂.

This species was originally found in New South Wales, but it appears to be more abundant in Victoria than in that State. The male and female were described from the material collected by Spry at Ferntree Gully; the types of these are in the National Museum. In his notes, Mr. Wilson says:—"This ant is very rare; found under stones." It is a shining black ant, about a quarter of an inch in length, with the mandibles, cheeks, clypeus, legs, pygidium and incisures of the abdomen dark red.

4. *PHYRACACES SENESCENS*, Wheeler. Broadmeadows (C. Oke).

Wheeler, Proc. Amer. Acad. Arts & Sc., 53, 3, p. 259, fig. 16, 1918, ♀.

Clark, Jour. Roy. Soc. W. Aust., X, p. 87, 1924, ♀

This species is slightly larger than the last; and easily distinguished from it by its greyish appearance, which it receives from the long, grey hairs on the body. It is black, with the mandibles, tips of the scapes, pygidium and parts of the legs castaneus.

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BLUE-TONGUED LIZARD AND SNAILS.

Hearing a crunching noise under the floor of the verandah of my house at Maldon, I lifted some of the boards quietly and discovered a full-grown Blue-tongued Lizard, *Tiliqua scincoides*, making a meal on snails, *Helix aspersa*, which had affixed their shells to the brick wall. The lizard crushed the shells with the greatest ease, and ate them, with their tenants. In country districts Blue-tongued Lizards, and also the Shingle-back, *Trachysaurus rugosus*, often establish themselves under the floors of dwellings, etc.; and it is a common belief (shared also by the writer) that houses thus "protected" are shunned by snakes. Yet these harmless, interesting, and useful reptiles sometimes are killed by persons who think that they are "dangerous-looking."—J.C.G.

TWO AUTUMN GREENHOOD ORCHIDS.

BY EDWARD E. PESCOTT, F.L.S.

The Greenhood family of orchids is with us all the year round. Hardly have the winter species ceased flowering, when the spring types are in bloom, then follow the summer forms, and soon those of the autumn months. None of the whole family has suffered from so much confusion as the Striped Greenhood, *Pterostylis reflexa*, R.Br. Its variable character, especially in size of the flower, and in height also has been chiefly responsible for this. Almost any low-growing, striped autumn Greenhood, having a fairly large flower, was classed as this species.

Indeed the Striped Greenhood itself is variable, and the southern Victorian form is a slender, rather tall species, with a medium-sized flower. The type form is very short, not often above 3 inches or 4 inches in height, with a wide and long flower, quite out of proportion with its total height. The type is well known in the Adelaide (S.A.) hills, but is not common in this State. Our best-known Victorian locality for the species was near Lubeck, many miles from Melbourne. It is, therefore, of great interest to orchid lovers to learn that, this autumn, Mr. W. H. Nicholls, a keen orchid collector, found a large number of the type form of the Striped Greenhood in the plain country, a few miles north of Melbourne. The plants were so plentiful that their rosettes of foliage literally carpeted the ground.

Mr. Nicholls and his fellow-collector, Mr. F. Bishop, are responsible for another, and even more important, "find." Collecting on the You Yangs, in April, 1923, they discovered a Greenhood, not previously obtained in this State, named *Pterostylis truncata*, Fitz. It grows at Mittagong, in New South Wales, and is figured in Fitzgerald's *Australian Orchids*. This species was found in great numbers, all over the You Yangs. The plants grow among Rock Fern and Snowy Mint Bush: one patch was found right on the summit of a huge granite boulder. The plant is a few inches in height, has a large flower, and narrow stem leaves. The labellum tapers to a point; the flower is striped brown.

green and white. The two points of the reflexed sepals are long and thin; so slender in fact that they readily break off, and the proposed common name, "Brittle Greenhood," has been suggested on that account.

In regard to the specific name, Fitzgerald says:—"I have named this species on account of the peculiar truncate form of its dorsal petal"; that refers to the shortening of the central portion of the "hood."

The illustrations (Plate II) show these two species, natural size.

NEED FOR ENTOMOLOGICAL SOCIETY.

In Brisbane an Entomological Society has been formed. Should there not be one for all Australia? I think it is needed. The Royal Australasian Ornithologists' Union had small beginnings; now it ranks with the Unions overseas, having a large membership, and a journal highly valued by bird students everywhere.

An Australian Entomological Society would, I am confident, meet with gradual success. Entomologists may not at present be numerous in the Commonwealth; but a Society would stimulate interest in insect life, and the field is wide enough for hundreds of workers. Perhaps our friends in Brisbane would be willing to consider an extension of *their* field, to admit to membership naturalists in all the States, and make the new body the Entomological Society of Australia. The move would surely be welcomed by their inter-state friends.

The Brisbane Society is almost a pioneer. Only once before, I believe, has an institution of the kind existed in Australia. In 1863 the Entomological Society of New South Wales was founded. Its life was short; for after the publication of two volumes of Transactions it became merged into the Linnean Society of New South Wales. Its members included Sir William Macleay and the Rev. R. L. King. The Transactions are much sought after by Australian entomologists, as they contain valuable papers, such as Macleay's on the Insects of Gayndah, and King's on Pselaphidae and Seydmænidæ.—F. E. WILSON.

MORNINGTON NATURALISTS' CLUB.

The desire of the Nature lover to share his pleasure led to the formation of the Mornington Naturalists' Club. The writer called a meeting of those interested in his project. The invitation was responded to by five little girls, and to them a scheme was submitted. This was in October last; now we have a membership of more than 40 young nature students. The word "field" was purposely omitted from our title, as much of our study is "marine." Our badge is the shell *Sunetta exca-
vala*, mounted on blue ribbon; members also wear a black silk neckerchief, which bears the monogram "M.N.C." in red letters. To pay for the badge, etc., and any incidental expenses, each member contributes 3d. per month. Meetings for instruction and microscopic study are held, after school, on week-day afternoons. Talks on bird life, and other subjects, have been given by several visitors, including Miss Cooper, missionary from West China.

When the warmer days came, and membership increased, we held our meetings on the beach, instead of at the leader's house. The usual programme was as follows:—A swim, some collecting, impromptu talks, tea (with which members came provided), arranging of future meetings and excursions, a game on the sand; and home before dark. For the winter months new arrangements were made, instruction in relays at the leader's house—different days for different subjects.

Those interested in botany are collecting for a local herbarium; shells and geological specimens are being added to a local collection, of which the leader's private collection forms the nucleus. For general meetings the use of the play pavilion in the school ground has been granted. Excursions have been held at frequent intervals. Many have been in the district; others have taken us further afield—two trips to the top of Arthur's Seat, by motor-waggon, two outings to Moorooduc, one to Frankston, and two to Melbourne (the first time with eight members, the second with 28). Members pay their own fares, a liberal concession being granted on the railways. Several members are learning to use a typewriter, and are thus able to type the names on the folders for the herbarium, and on cards for the specimens in the other collections.—REV. G. Cox, Leader M.N.C.

THE SPIDER'S CARDING MACHINE.

By S. BUTLER.

Many of the snares made by spiders are ingenious. They are all spun from the silk "factory," situated on the floor of the abdomen. Silk of different kinds can be spun at the will of the operator: the softest down, to encircle the eggs, a waterproof covering for the cocoon, lines covered with a



Web of a Cribellate Spider.



Family Dictynidae, Genus Amaurobius

viscid fluid, that remind one of bird-limed sticks, strong cables to suspend the spider (it has been stated that four miles of this cable would weigh only one grain). Hackled snaring lines are the work of the carding machine, peculiar to the Cribellate spiders.

One of our most common Cribellate species is the Black House-spider. It is found almost everywhere. Out-houses and old fences abound with its webs. It is placed by arachnologists in the family Dictynidae, and is named *Amaurobius robustus*. The web is easily recognised. It has a tubular retreat, and woven out from this is the sheet, composed of straight, parallel foundation ropes with the fluffy snaring line laid between them in a zig-zag fashion.

This species is less than one inch in length; and, at first sight, appears to be black. The strong legs are of a dark rich brown colour. The front portion of the body, the cephalothorax, has a dark steel-iridescence, while the abdomen bears an inconspicuous pattern pocket. The eyes

are in two straight rows of four each, and some are of a pearly colour. *A. robustus* is a fine, well-groomed spider, very active when on the defence. A few years ago, at Black Rock, a rather formidable wasp was observed, teasing at a web, with the object of tempting the owner outside, and converting it into "paralysed provender" for wasp larvæ, yet unborn. Without hesitation, the spider emerged, ready for battle. The wasp, with lightning speed, darted forward, and I expected to see the spider drop, fatally stabbed by a poisoned stiletto. Not so; the spider, raising itself, struck with the fangs, which just missed the wasp as it flew from the scene. I waited patiently for half an hour, but the wasp did not return.

Amaurobius robustus, like all other Cribellate spiders, has a minute carding machine, which can be observed under the microscope, or a strong hand-lens. On the hind legs only, on the second last joint, is a beautiful little comb. It cannot be mistaken, as the teeth are as even as those of a toilet comb. This is the calamistrum (=a comb).



Calamistrum on Hind Leg

Touching the spinnerets, in front, is a small, oval plate, with a central division. This plate is really a spinneret. Highly magnified, it appears as a fine sieve; it is known as the cribellum (=a sieve). The calamistrum and the cribellum form the spider's carding-machine.

When a blanket is woven, its surfaces are hard and rough, as those of a bran sack. The soft, downy surface is produced by passing it under a rotating drum, covered with fine wire bristles, which tease out the surface. A somewhat similar result is obtained by the spider with its carding-machine.

The hackled snaring-line is spun through the sieve-plate. The two combs then attack this line, and tease out the threads; instead of having the glassy, rod-like nature of the foundation lines, it resembles a strand of frayed wool, and has power to entangle prey. A fly that is caught in it has small hope of escape. This line is laid in a zig-zag manner, between the guy ropes, and when this feature is visible on a web, you may be certain that the owner has the comb and sieve-plate just described.

NOTES FROM FIELD AND STUDY

FERN REPRODUCTION.

The method of reproduction of ferns from spores, familiar to all students of plant life, is recorded as having remained a mystery until it was first discovered by an eminent Polish Naturalist, Count Suninski, in 1848. An additional method of extensive reproduction is by the development of new plants from creeping stems of parent plants. These stems, or rhizomes, are usually either closely under, or above, the surface of the ground. A familiar example of this mode is to be found in the Common Bracken Fern. Other examples are readily observable in the Rainbow, Finger, Coral and Maiden-hair Ferns. A method of reproduction in some of our truncated, or distinctively-stemmed, native species, such as the King, Fishbone, Rough and Soft Tree Ferns, is in development of numerous crowns, for these, when carefully removed from the parent plant and treated, become well-established plants. Still another method is by the development of young plants in the form of bulbils at the apex of, or along or at the axes of the stems (rachis) of the fronds. Mother Fern, a native species, derives its botanical name, *Asplenium bulbiferum*, from this habit of reproduction. Another, the Common Shield Fern, which is familiar to our fern lovers, adopts a similar method. Although these bulbils may be removed and grown separately in pots or in the fernery, better results are obtained by pegging the fronds bearing them to the ground, and allowing the bulbils to root before severing them from the parent frond. The object of this note is to draw attention to the reproduction in the case of the well-known Staghorn and Elkhorn Ferns of New South Wales and Queensland, which many people grow in their ferneries. In addition to their ordinary method of reproduction from spores, which they bear in large patches of sori on their fertile fronds, young plants are borne in attachment to the older ones. Are they as adjoining crowns to the parent? Are they developed from the sheath of the parent plant or from the root system? Are they developments from the rhizomes? Are they bulbils, or may they adopt all these methods for their reproduction?—F. PITCHER.

SWIFT MOTHS' LARVAL LIFE.

The familiar large, brown moths, *Porina fuscomaculata*, Walker, that make their appearance every year, about May and June, and, attracted by light, are persistent in their efforts to get through windows, belong to the family *Hepialidæ*. All the members of this family, commonly known as Swift Moths, pass their larval stages burrowing in timber, and some species, including *Porina*, specialise in the roots of trees. The pupæ of *Porina*, when ready to emerge, work up through the soil to the surface. Usually the skin ruptures when the pupa is only half above ground, and the moth is liberated.

In my garden, at East Malvern, some large Black Wattles, *Acacia mollissima*, are, apparently, badly infested by this species, as I counted no fewer than 23 pupæ cases, either projecting from, or lying on, the ground beneath the trees. Late one afternoon I saw a moth escaping from its case. These moths emerge at the commencement of the rainy season, when the ground becomes soft. They would, doubtless, perish in numbers if their season for emergence were summer, since the ground would be too hard for them then. Such tragedies occur in the beetle world. The grubs of our common Cetonids, *Eupæcila australasie*, Don, which live in decaying wood, when about to pupate, construct a rounded case, beautifully smooth inside and rough externally. During a long, dry spell, I found a number of these cases at Seaford. Each contained a beetle, perfect, but dead. The cases were very dry and hard, and, apparently, the beetles had been unable to liberate themselves. This probably explains the fact that, during the summer season, Cetonids generally are most abundant, after a day or two of rain.—
F. E. WILSON.

HABITS OF A MALLEE WASP.

A small wasp belonging to the genus *Bembex* is common during the summer in North-Western Victoria. It has most engaging ways, and one outstanding characteristic, in which it differs materially from most other species of wasps; it makes periodical visits to its burrow, with food for its offspring. This appears to me to reveal a higher order of intelligence than is shown by a wasp that, after paralysing its prey, placing it in a burrow or prepared cell, and laying an

egg upon it, troubles no more. The devotion of the ever-busy, active *Bembex* to its offspring is, at times, charming to observe. The wasp shows as much concern, on returning to its broken burrow, as do birds of many species when their eggs have been stolen. I was particularly captivated by the solicitude for her offspring, and the utter disregard for her own safety, displayed by one wasp, whose burrow I was examining. As I excavated with the point of a knife, she did her utmost to fill in the broken tunnel, her tiny forelegs working feverishly. I had to push her aside several times as I worked. Though in search of knowledge, I was tempted to let the insect win the day. The pupa is now housed in a pill-box. One summer's day it will emerge, and when I have satisfied my curiosity, and further enriched my note-book, young *Bembex* will have the freedom of the sands.—L.G.G.

"BILL BAILLIE"—A PET OPOSSUM.

For nearly 13 years a Silver-grey, or Common, Opossum *Trichosurus vulpecula*, has lived in captivity. His mother was killed by dogs, and he was taken from her pouch. A soft, pink and grey ball of fur, with bright, bead-like eyes, he hardly filled the cup of my hands when presented to me. We had been reading the late Mrs. Ellis Rowan's book, "Bill Baillie," and the name of her animal hero was bestowed upon the newcomer.

Our pet was so young that it became a problem how to feed him. The problem was solved by soaking one end of a strip of flannel in milk, in a saucer, and giving the other end to "Bill Baillie." He quickly drained the saucer. Later he was fed from a teaspoon. No wild creature can be perfectly contented in captivity; but our opossum became so tame that we realised that freedom would mean for him almost certain destruction by dogs. So a large, wire-netted enclosure was provided for him, with as much "wild" comfort as possible. There he has lived, since 1913, apparently quite happily, during the most of the time: occasionally we have been conscious of a dumb pleading for freedom, and have almost regretted that we gave "Bill Baillie" the chance of life in his infancy. He has been fed on gum leaves, fruit, vegetables, nuts, thistles, dock leaves, sorrel, and bread and milk, or bread and jam. Lately he has shown signs of ageing; his appetite is still good, but he is less active, and

spends more time now in his grass-lined box. He has just returned from a fortnight's "holiday." He had been ill, so we took him with us to Healesville. The change has almost rejuvenated him. He showed plainly his pleasure at being back in the old quarters.

Our experience will deter us from ever again caging a wild creature. Though "Bill," doubtless, has lived longer than he would have done in freedom, and enjoyed more comfort, too, I think that he would have preferred life in the bush, with all its dangers.—E.C.

OUR ONLY POPPY.

In the *Kew Bulletin*, No. 4, 1905, J. Hutchinson ("Contributions towards a Phylogenetic Classification of Flowering Plants, V") remarks on the paucity of the Papaveraceae in the Southern Hemisphere, and refers to the only representative in South Africa as *Papaver aculeatum*, and to our one species as *P. horridum*. The three chief areas of concentration of this family are in California, whence comes *Eschscholtzia*, the eastern Mediterranean and Western China, the home of so many lovely *Meconopsis*, among which is Farrar's "beloved Celestial Poppy," with flowers of every shade, from pure white through all tones of azure, mauve and lilac to clean pink. In the same *Bulletin*, Braid revises the *Alphitonias*, a genus of the *Rhamnaceae*, ranging from Borneo to Hawaii, and from the Philippines to northern New South Wales. He recognises five Australian species hitherto lumped in *A. excelsa*: this is well known as a valuable tree yielding fine timber, good tanning bark and foliage useful as fodder. The leaves, it is interesting to note, froth in water, probably from the presence of saponin, and are used by local school children to clean inky fingers. The bark from young shoots, especially of *A. Petriei*, has a strong odour of sarsaparilla.—C.S.S.

A USEFUL GRASS.

In the *Journal of Ecology*, January, 1925, appears an account, by F. W. Oliver, of the grass *Spartina Townsendii*, which somewhat miraculously made its appearance in the sheltered waters of Southampton, more than 50 years ago. Since then it has extended its range for nearly 20 miles on each side of the Isle of Wight, and has appeared also on the

French coast opposite, where it has spread even more quickly and widely. This grass is described as being better fitted for the reclamation and stabilising of muddy foreshores than any other in the world, and it is well worth the consideration of our port authorities. The normal habitat of *Spartina* is soft, tidal mud, extending not further than three feet below high-water mark of spring tides, where it ousts *Zostera nana*, when this exists, and even overwhelms *Scirpus maritimus* on the landward side. Colonisation commences by the appearance of little scattered tufts in the soft mud, arising from seed. These extend by creeping stolons, which become anchored by long, unbranched roots, going as deeply as four feet, and by tufted, branched roots near the surface, especially concerned with nutrition. The tufts, which reach a height of two or three feet, in time coalesce, the surface is raised by silting, the mud eventually consolidated, and meadowing results. As a fodder the *Spartina* is relished by beasts of all kinds, and it is cut and stacked for their winter use.—C.S.S.

GIPPSLAND PERCH AT BAIRNSDALE.

While fishing on Easter Monday, above the waterworks, Bairnsdale Water Supply, my younger son and I hooked eight Gippsland perch, *Percalatus fluviatilis*, Stead. All were small, one being only 8½ inches in length, and the others 10 inches, or a little over. From the angler's point of view the catch was disappointing; but as the small size of these examples points to the possibility of the species breeding in the river, the matter is of great interest to those concerned in the preservation of our indigenous fishes. Unfortunately, nothing is known as to the breeding habits of this splendid fish, admirable from both its sporting and edible qualities.—E.C.

HOUSE-FLIES AND BUSH-FLIES.

In references to the menace to public health and the almost intolerable annoyance caused by flies, in our cities, suburbs, and country districts, two distinct species are almost invariably confused. Few discriminate between the common House-fly, *Musca domestica*, and the so-called Bush-fly, *M. vetustissima*. Both are exceedingly abundant, and both are

widely distributed, the former throughout the temperate and tropical regions of the world, the latter throughout this continent and in India. The habits of the one are too disgusting and too well known to require mention here; those of the other, if objectionable in the extreme, can be enumerated only in part for want of more precise knowledge.

The House-fly is pre-eminently a denizen of our dwellings, yards, food shops and restaurants. Its abundance, or scarcity, during the summer and autumn months, is determined by the amount and nature of the filth to which it has access. Wire-gauze would be a drug on the market, instead of a costly necessity, if our municipal enactments were strictly enforced.

The Bush-fly prefers open spaces—suburban streets, gardens, beaches, grazing lands, forests and plains, and even the arid interior of the Continent. It rarely enters houses, and is never seen on exposed food indoors. It is not dependent upon filth for its existence, and is as abundant in uninhabited territory, plains and tablelands of the interior, and the islands of the Kimberley Coast, as it is in our populous seaside resorts. Very little is known of its breeding habits, but it is safe to say that its numbers would not be materially reduced by the application of regulations designed for the control of the House-fly.

G.F.H.

REVISION OF THE EUCALYPTS.

The sixty-fourth part of Mr. J. H. Maiden's *Critical Revision of the Genus Eucalyptus* is devoted to the description of the seeds, commenced in the previous part. As with every other feature in the species of this genus, there is great diversity in these. In size they vary from $\frac{1}{2}$ to 16 mm. long and from $\frac{1}{2}$ to 7 mm. broad, the smallest being derived from *E. dealbata* and the largest from *E. calophylla*. In more than 100 kinds the length does not exceed 2 mm.

Though there seems to be no constant correspondence between size of seed and capsule, those of *E. Raveretiana* for example, with the smallest fruits of all, being as large as those

of our Woollybutt, *E. longifolia*; generally speaking, the large forest trees appear to have the smallest fruits and seeds, and the scrubby, dry country species the largest. In dealing with their vitality, Mr. Maiden states he has no difficulty in getting germination up to 30 years, though Professor A. J. Ewart and Dr. Cuthbert Hall were not so successful, the latter failing to raise seedlings from material older than 18 years. Usually the sterile seeds, which serve the purpose of packing, outnumber the larger and darker fertile ones. In the Bloodwoods there are only one of the latter and a few of the others in each cell, but the numbers in other species are not given.

In grouping the seeds into a score or so of series Mr. Maiden has regard to the presence of a wing or membranous fringe, its extent and position—this feature is most pronounced in the Bloodwoods—the shape and sculpture, the position of the hilum, the colour, from light brown to jet black, and to the nature of the surface of the testa, which may be smooth, striated, pitted or scurfy.

It will be news to many that when in sore straits, perhaps only in times when even grass seeds and nardoo fail them, the seeds of at least one species, a Coolabah, *E. bicolor*, serve as food for the natives of West Central Queensland, who prepare them much in the way they do the sporocarps of the *Marsilea*.

It is now 22 years since the appearance of the first part of Mr. Maiden's *magnum opus*, and the completion of it is not yet, though it seems to be within measurable distance. Three years ago, when part 53 was published, he was of opinion it would take at least 65 parts to deal with the total of perhaps 350 species and to contain all the material required to do adequate justice to his subject.

However, there are still more species to be described. *Buracoppinensis*, *Bloxsomei* and *Staeri* are noticed, which will bring the number to 336, and no doubt there are others. The seedlings, too, have yet to be figured, and, lastly, there is to come the enormous key which was his main object in engaging in his formidable task, and will be its fitting and triumphant culmination. It is therefore likely that the estimate, at least in regard to the number of parts, will be considerably exceeded.

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EXCURSIONS.

SATURDAY, 18th JULY.—Mt. Morgan, Belgrave. Object: Heath.
Leader: Mr. F. Pitcher. Meet at Flinders St. Station for
8.50 a.m. train. Week-end tickets to Belgrave. Lunch should
be taken.

SATURDAY, 1st AUGUST.—Mitcham. Object: Heath. Leader:
Mr. F. G. A. Barnard. Meet at Flinders St. Station for 1.30
p.m. train.

PHOTOGRAPHS FOR THE NATURALIST.

It is proposed, while funds permit, to include one plate at
least in each issue of the *Naturalist*. Members are invited to
submit prints for consideration by the Editor and the Publishing
Committee. Unusual subjects are desired, not photographs of
scenery, etc. Writers of papers might submit photographs suitable
for illustrations.—Editor.

All contributions for the *Naturalist*, and letters to the Editor,
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THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 7th August, 1925

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 10th AUGUST, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—

Miss Gertrude Simpson,
42 Glendearg Grove,
Malvern.

PROPOSER,

Miss G. Nokes

SECONDER.

Mr. F. G. A. Barnard.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. By Mr. L. G. Chandler (communicated by Mr. C. Barrett)—"Habits of the Sand-Wasp."

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

9. Presentation to Mr. F. G. A. Barnard, on behalf of members of the Club, to mark appreciation of his long and meritorious services.

EXCURSIONS.

SATURDAY, 15th AUGUST.—You Yangs. Object: General. Leader: Mr. C. Daley, B.A. Meet at Spencer St. Station for 6.30 a.m. train. Lunch should be taken. Walk about 10 miles.

SATURDAY, 29th AUGUST.—Kilby Lagoon. Object: Pond Life. Leader: Mr. Gray. Meet at 2 o'clock.

SATURDAY, 5th SEPTEMBER.—Studley Park. Object: General. Leader: Mr. A. E. Rodda. Meet Johnston St. Bridge, 2 o'clock.

SATURDAY, 12th SEPTEMBER.—Diamond Creek. Object: Orchids. Leader: Mr. E. E. Pescott, F.L.S. Meet at Prince's Bridge Station for 1.20 p.m. train.

The Victorian Naturalist

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 13th July, 1925. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

ELECTION OF MEMBERS.

On a ballot being taken, the following were duly elected as members of the Club:—As ordinary members: Mrs. Geo. Coghill, 17 Monomeath Avenue, Canterbury; Mr. S. F. Mann, Caramut; and Mr. A. R. Mills, LL.B., 430 Little Collins Street, Melbourne. As associate members: Master Colin Keith Fraser, Charles Street, Kew, and Master Ronald Ian Wallace, c/o Prof. Wallace, Kew.

GENERAL BUSINESS.

Mr. F. Pitcher moved, "That this Club protests against the proposed destruction of the trees in Victoria Parade." Seconded by Mr. A. E. Rodda. Messrs. McColl, F. G. A. Barnard and A. D. Hardy, and the President, took part in the discussion that followed. The motion was carried unanimously.

PAPERS.

1. By Mr. J. C. Goudie—"Notes on the Coleoptera of North-Western Victoria," Part XIII. The author dealt with beetles belonging to the families Brenthidæ, Anthribidæ, and Cerambycidæ (several very fine and rare species of Longicorns were included in the list).

Messrs. C. Oke, D. Best and Hardy discussed the paper.

2. By Mr. T. S. Hart, M.A.—"The Victorian Species of *Cassytha*." The author described the differences between the five species, their range, and habits. The paper was discussed by Messrs. H. B. Williamson, Hardy, Pitcher and the President.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Specimen of *Cassytha paniculata*.

By Mr. C. Daley, B.A., F.L.S.—Views of Californian Alligator Farm.

By Mr. J. C. Goudie—Case containing species of Longicorn beetles (Cerambycidæ), from Sea Lake, Birchip district, Victoria, in illustration of his paper.

By Mr. J. A. Kershaw—*Nautilus pompilius*, found on Three-mile Beach, at National Park, Wilson's Promontory, by Mr. W. H. Ferguson, May, 1925. A most unusual occurrence.

By Mr. V. H. Miller—Wattle Scale, *Lecanium baccatum*.

By Mr. C. Oke—Three species of Victorian Swift-moths, *Porina australis*, *P. fuscomaculata*, and *Oncoptera intricata*. The larvæ of these moths feed on grass roots.

By Mr. A. E. Rodda—Pyromorphite (Chloro-phosphate of Lead), from Queensland.

By Mr. E. E. Pescott, F.L.S.—Growing plant of the "Wheat" orchid, *Bulbophyllum Shepherdii*, F.v.M., in flower. Native to New South Wales and Queensland.

By Mr. J. Searle—Small Chalcid wasp, and "shell" of aphids from which the parasite emerged. (Shown under microscope.)

By Mr. P. R. H. St. John—Herbarium specimens of (1) *Adiantum capillus veneris* (Linn), English Maiden-hair Fern, Mt. Evelyn, 18th February, 1925 (new for Victoria); (2) *Casuarina suberosa* (Otto and Diet), variety *pendula*, the Drooping Sheoke, from Frankston, April, 1925; (3) *Eucalyptus phlebophylla* (F. von M.), Weeping Cabbage Gum, from Frankston, April, 1925; (4) *Eucalyptus acervula* (Hook fil), Red Gum of Tasmania, Frankston, 5th July, 1925; (5) *Eucalyptus acacieformis* (Dean and Maiden), Red Peppermint of New South Wales, grown by Mr. Alister Clarke, Bulla, Vic., 1, 2, 3 and 4, collected by exhibitor.

By Mr. H. B. Williamson, F.L.S.—Photographs of large Dodder-laurel.

THE BATHURST BURR.

One of the troublesome weeds of Victoria, *Xanthium spinosum*, is ubiquitous, even being found near Anzac Beach, on Gallipoli. It is generally considered to be a native of South America, and to have been introduced into Southern Europe between the years 1700-1750. Semi-fossilised fruits have, however, now been found in Neolithic deposits in Bulgaria. They have been carefully examined at the Royal Botanic Gardens, Kew, and their identity established. The "fruits" had been collected in considerable quantity and stored, as if for use as food or fodder. The discovery would indicate that the species existed in Europe long before the date accepted by Thellung (Kew "Bulletin," No. 5, 1923).—A.J.T.

THE VICTORIAN SPECIES OF CASSYTHA.

By T. S. HART, M.A.

Five species of *Cassytha* have been recorded as Victorian, but of these *C. paniculata* is given only as from the Hume River, and is therefore indicated in the Census as doubtfully Victorian. The other six Australian species occur in Western Australia and the northern part of the continent.

Cassytha melantha, the Large Dodder-laurel, and *C. glabella*, the Tangled Dodder-laurel, are clearly defined species; but the boundary between the other two species (*C. pubescens* and *C. phaeolasia*) seems to be doubtful. The authority for *C. phaeolasia*, Spiked Dodder-laurel, is F. von Müller, *Fragmenta V.* (1866), where it appears as a variety of *C. paniculata*, or possibly a distinct species. The note may be thus translated:—"Of this (that is, *paniculata*) the variety *phaeolasia*, unless by this name is to be noted a distinct species, from the coast of Twofold Bay, is at once to be recognised by the rusty-tomentose fruits." A little later there follows a note on *C. pubescens*, in which a variety, *macrostachya*, is mentioned.

From the original note, *C. phaeolasia* would be expected to have fruits like *C. paniculata*, except for the hairs, that is, ribbed fruits. (The term fruit is used to include the succulent part, not merely the matured carpel.) Bentham (1870), who would, no doubt, be at some disadvantage as regards the direct observation of the succulent fruits, makes a distinction in the lengthening of the spike, as well as in the shape of the fruiting perianth; so also Müller, in the *Key to the System of Victorian Plants* (1888). Without fruit, any long-spiked *pubescens* might be merged in *phaeolasia*. Bentham says that *C. phaeolasia* is very near *C. pubescens*, differing from it in inflorescence, and perhaps in the form of its fruit; but he had not seen the fruit quite ripe. Fruiting perianths of *C. phaeolasia* are given as obovoid, or pear shaped, those of *C. pubescens* as globular.

Müller, in *Native Plants of Victoria Succinctly Defined* (1879), omits *C. phaeolasia*; possibly he doubted it as Victorian; perhaps it is merged in *pubescens*. If this is not an error in compiling, it agrees with a hesitation to remove the variety *macrostachya* from *C. pubescens*, for this variety is undoubtedly Victorian, as will appear below,

Having obtained specimens with strongly-ribbed and brownish tomentose fruits, at Eagle Point, near Bairnsdale, I concluded, from examination of the description, that these were typical *phæolasia*. At the same time I read of the variety *macrostachya* of *pubescens*.

The fruits of *C. pubescens*, as collected at Black Rock, though variable in relation of width to height, showing both squat and relatively tall forms, are, as the Baron expresses it in the *Fragmenta*, "gently-angled;" looked at end on, the departure from a circular outline is slight, so that calling them globular is not misleading.

Through the courtesy of the late Mr. J. R. Tovey, I was able to examine the National Herbarium specimens, and found there, in the *C. phæolasia* package, the following:—

A specimen labelled *C. pubescens macrostachya*, from Portland, one of Bentham's localities for *C. phæolasia*. I see no sufficient reason for separating this specimen from *C. pubescens*. No fruits were seen. Elongated spikes are present.

Another, *C. pubescens*, shrubbery at the coast near Brighton (1853), F von M. The spikes have flowers separate in the lower part. No fruits. Brighton is one of Bentham's localities for *C. phæolasia*.

Another, *C. pubescens* on *Melaleucas*, at the Yarra River (1853), Dr. M. The shrunken fruit in the packet do not show ribs. The flowers are mostly separate.

These specimens, though retaining *C. pubescens* labels, are found with *C. Phæolasia*, indicating a partial acquiescence in Bentham's arrangement; but it is not known to me when they were so placed. They represent *C. pubescens*, var. *macrostachya*.

With these I found two other examples, which are clearly the Baron's *phæolasia*, namely:—

A specimen labelled "Heath ground, near the Womboyne, Drupe 6-angular pyriform, brownish, hairy, D.M., Sept. '60." This has with it a packet from the same locality Heath ground, near the Womboyne, *Cassytha paniculata*. The date is before the separation of *C. phæolasia* from *C. paniculata*. The dry fruits show ribs, and are brown-hairy.

Another specimen has two labels, "*C. phæolasia*, Ferd. Mueller, East Gippsland," and "*Cassytha*, Womboyne." The buds are distinctly brown-hairy.

The Womboyne River is about 18 miles north of Cape Howe, hence these examples are not Victorian. The specimens I have from Eagle Point, and other localities about the

Gippsland Lakes, may be placed as *C. phaeolasia* in the original sense, with these Womboyne specimens.

Turning then to the Herbarium *C. pubescens* packet, there are found *C. pubescens*, rocky hills near Swanport; a spike on this shows many points of attachment of flowers an eighth of an inch, or perhaps more, apart. Also, *C. pubescens*, R.Br., var. *divisa*, Mt. Lofty Rangè, at the Cataract, F.M., '49; and another label which, translated, reads "*C. pubescens*, Mt. Lofty. Fruit opaque, green, very gently six-angled, with an umbo at the apex." (I have translated Latin labels when such occur.) These may be placed with var. *macrostachya*. I have not found any other reference to var. *divisa*.

I then proceeded to look for long-spiked *C. pubescens*. On low shrubs east of Black Rock (Ebdèn's Park), *C. pubescens* was in great abundance, all plants noted having the typical short-spiked inflorescence. On searching in tall tea tree further south, on the inner side of the Beach Road, spikes 1.9 to 2.7 inches long were found. The fruits were all referable to *pubescens*.

I have also found elongated spikes in *Melaleuca* scrub at Scoresby, and while one patch had the aspect, on a general view, of a patch referred to *phaeolasia* at Eagle Point, and possibly some fruits were a little more angular, I saw no sufficient reason to remove the Scoresby specimens from *C. pubescens*. It should be noticed that the hairs, and often partly-reddish fruits, in *C. pubescens* are quite distinct from those of *phaeolasia*. In *pubescens*, the skin colour of the fruit shows through, with minute, scattered hairs. In *phaeolasia* the hairs are denser and brownish.

I have come to these conclusions:—

That typical *C. phaeolasia*, F.v.M., is that form in which the fruit is strongly angled, or ribbed, and has a rusty tomentum. Its fruits are distinct in form from those of *C. pubescens*. The National Herbarium specimens seen by me do not show it as Victorian, but it occurs freely about the Gippsland Lakes. Eagle Point is, so far, the most inland locality. Shady conditions may be favourable to the elongation of the spikes.

As regards hosts, a few of my notes mention weak attachments to certain species, and it is not unlikely that the parasite flourishes more on some plants than on others. Starting from the soil, the plant is less likely to grow in cultivated lands, where it may be destroyed before permanently establishing itself. Attachments to introduced plants are, therefore, mainly to be expected where these plants have run

wild, or are under semi-natural plantation conditions. I have, however, a few examples of its occurrence on introduced plants.

Mr. A. D. Hardy notes *C. melantha* on Furze, *Ulex Europæus* at Studley Park. I have observed the same species on Willows, *Salix alba*, on the Mitchell River, above Bairnsdale, but the attack was light compared with that on the *Tristania*, from which it had spread. I have observed probably *C. pubescens* on a pine, probably *P. Laricio*, at Creswick, attaching to the needles; and also on Blackberry, at Scoresby. A *Cassythia*, doubtless the same species, I saw on *Pittosporum undulatum*, near Mornington, and *C. glabella*, attached to a self-sown pine, near Frankston, the pine being still small and among the low scrub.

Prof. A. J. Ewart has shown that cotyledons do not appear in the young seedling, and that there is the very peculiar absorption of the store of material in the seed by the tip of the shoot. Bentham records that the cotyledons are distinct at an early stage, though consolidated later, assuming the appearance of a fleshy endosperm. The two cotyledons can be found on examination, and on several natural seedlings there appear two minute scars, or marks, below the first scale leaf, which may be the original points of attachment of the cotyledons. In having large cotyledons, the seed has a general character of the Lauraceæ.

The succulent fruit is derived from the receptacle of the flower, the hard interior being derived from the carpel, and though the family is described as monocarpellary, a six-rayed character appears, at least sometimes, in the summit of this hard portion. The marked, or gentle, six-angled character, when seen in the succulent part, is preserving or agreeing with the six-parted perianth.

I have taken several seedlings on two occasions, in the southern part of Moormunng, south-west of Bairnsdale. These were, no doubt, all *C. melantha*, under which they were found; though, as the fruit is probably taken by birds, they were not necessarily from that particular plant. I have also taken natural seedlings, either *phalasia* or *pubescens*, at Eagle Point Park.

SYNOPSIS OF VICTORIAN CASSYTHIAS.

Fruit ellipsoid, red or yellow; flowers in clusters; plant glabrous; stems and branches threadlike. *C. glabella*.

Fruit globular, green; spikes short or almost capitate; plant glabrous, except the flowers; stems and branches thick. *C. melantha*.

Fruit depressed, globular to ovate-globular, often with a colour tinge, very gently six-angled on careful inspection, minutely puberulent; spikes short or elongated; plant more or less pubescent; stems moderately thick.

C. pubescens.

Fruit pear-shaped, ribbed at least in typical examples, distinctly hairy; spike elongated (? is it always elongated early); plant more or less pubescent; stems moderately thick.

C. phæolasia.

Fruit ribbed, glabrous or nearly so; spike usually elongated, sometimes branched; plant glabrous or nearly so.

C. paniculata (doubtfully Victorian).

NOTES ON THE FORAMINIFERA.

BY F. CHAPMAN, A.L.S.

The study of that fascinating group of lowly animals, the foraminifera, has of late been brought to the fore by their increasing usefulness in the determination of the age of rock groups, and as constituting indicators of former geographical conditions. They have been also useful in oil-finding, as evidenced by the establishment, in America, of at least two flourishing Bureaus for Foraminiferal Research.

The literature on the subject is enormous, but that should not deter any naturalist from taking up the study of these little shells; for by seeking to know the principal types, ascertained from text-books on the subject, such as Brady's Challenger Report and the recent work by Cushman, published by the United States National Museum, a good working knowledge can soon be acquired.

It is remarkable to see a decided renaissance of enquiry made in recent years in regard to the foraminifera. Since this interest has spread even to our own Club, and the fraternal Society of Microscopists, it may not be out of place for an old worker to contribute a few notes for beginners in this study. Many successful students of nature in the past commenced by merely collecting. There is very much to be said in favour of this, and little against it. Gathering and identifying species often leads to a search for further knowledge, and every one can add to the "cairn" of facts.

Since an all-round student of nature should know something of geology, as well as of zoology, it is assumed that the

collector of foraminifera desire to know where and how to obtain these tiny shells, both in the rocks and in the living state. Fossil foraminifera are, perhaps, rather difficult to find in Victorian rocks older than the Tertiary, though most beautiful specimens can be washed out of the Chalk of Gingin, Western Australia. If, however, one has a friend who collects Tertiary shells, and who is in the habit of bringing home large bags of marl and other shell-rock, he might arrange to take over cast-off siftings, since these will generally prove a mine of microzoa. Such material may come from Torquay, from Muddy Creek, or from the mullock heaps of the Altona Bay coal-shaft. But in every case the position of the bed should also be noted as well as the locality.

Prolific strata can be found at Torquay, in the lower part of the cliff, as at Bird Rock, but some of the higher layers are equally profitable. Towards Rocky Point, beyond Fisherman's Steps, for example, a soapy marl band comes down to the shore. This band contains large numbers of *Globigerina*, which points to its pelagic, or open sea character, in the Miocene period, whilst there are some beautiful forms of *Cornuspira* and *Lagena* also present.

The marls of the fossiliferous beds at Torquay do not require much washing, only so far as to remove the flocculent clay which binds the particles. After drying, the foraminiferous material can be sifted into grades to facilitate the sorting.

As regards living forms, probably the richest shore-line deposit near to Melbourne is the strand of Altona Bay. But the results will be variable, according to the season of the year, for so much depends on the conditions of tides and currents. The muds of shallow water round piles and groynes are often a rich source of wonderful glassy *Lagena*.

No matter where we obtain our foraminiferal material, something of interest is always sure to be discovered, and when we examine their variable and ornate shells we cannot wonder that they were first favourites among the older microscopists, who were then only equipped with an ordinary magnifying glass, or a simple microscope such as the herbalists used.

Some practical hints as to collecting foraminifera may be found in the *Naturalist* for April, 1910; and the known Victorian species of littoral forms are listed in my paper, "Recent Foraminifera of Victoria: Some Littoral Gatherings," published by the Quekett Microscopical Club, November, 1907.

THE VICTORIAN TERMITES.

By G. F. HILL.

Notwithstanding that "White-ants" are frequently stated to be the cause of considerable damage to forest, ornamental, and cultivated trees, and to fences, buildings, etc., less is known of the Termite fauna of this State than of that of any other part of the Commonwealth, with the exception of Tasmania and South Australia.

In his list of Australian Termites, Mjöberg (1920) recorded only five species from Victoria, one of which, *Coptotermes lacteus* (Frogg.), is unknown to me from this State, and is not referred to in the following notes. The number, including described and undescribed species, is now known to be 16, representing nine genera, as follows:—*Stolotermes*, 1; *Calotermes*, 4; *Porotermes*, 2; *Leucotermes*, 1; *Coptotermes*, 2; *Rhinotermes*, 1; *Eutermes*, 2; *Hamitermes*, 1; *Microcerotermes*, 2. The soldier caste of all of the above species, and the imago also of 13 of them, are known from Victoria; the remaining three species may be identical with species known in all castes from other States.

So little systematic collecting has been done in this group of insects in Victoria, that one may safely predict many additions to the above total of species, though it is improbable that more than one of the four remaining Australian genera will be found to be represented.

Few authorities are in agreement regarding the classification of the Termites, and no system yet devised has been generally accepted, though most of the genera, and many of the species, are easily recognised. The following notes and figures (more or less diagrammatic) will be found sufficient to enable one to identify most, if not all, of the species enumerated, without reference to the long, technical descriptions often so necessary for the differentiation of all the species of a faunal region.

It should be mentioned, however, that in some genera, e.g., *Coptotermes*, *Rhinotermes*, *Microcerotermes*, specific determinations cannot always be made from soldiers and workers only; that while the imagoes of a given species rarely vary appreciably, soldiers, even from the same colony, may show marked differences in the size and shape of the head, e.g., *Calotermes*, *Porotermes*, *Microcerotermes*; that in some species there may be two dissimilar forms of soldiers in the

same colony, e.g., *Rhinotermes* and *Eutermes*; that from two to five distinct species may be more or less closely associated in the same colony; that in species in which two forms of soldiers are normally present one may be absent, e.g., in young colonies of *Rhinotermes*; and that the functions of a true king and queen (i.e., reproductive forms derived from winged imagos) may be performed by apterous or brachypterous adult males and females, or by one to several true kings mated with from one to a hundred or more apterous females.

As a rule, the genus is most readily determined from the soldier caste, and the species from the imago. The worker caste (absent in *Calotermes* and *Porotermes*) generally possesses good generic characters, but is often practically useless in attempting specific determinations.

The following list of species, with brief descriptions of each, comprise the Termite fauna of Victoria, as at present known to me. Measurements are given in millimetres (approximately $1/25$ inch):—

Stolotermes victoriensis, Hill: Imago, length with wings 11.00, without wings 6.5; a small, dark-brown species, with fuscous wings, very small pronotum, no ocelli; eyes small, prominent; antennæ 16-jointed; anterior margin of wing with several short, stout veins, running diagonally upwards to the costa; cerci 3-jointed. Soldier: Total length, 7-9.00; head with mandibles, 3.30-3.60; head much flattened, jaws bent downwards slightly, with two broad and one narrow teeth on left and two broad teeth on right; teeth large, leaf-like, and directed forward; antennæ 15-jointed; eyes black and very distinct; pronotum small; cerci 3-jointed. Found in small colonies in rotten logs, in damp, heavily-timbered, hilly, or mountainous country; winged imagos present in January. The four remaining species are from Tasmania (1), New Zealand (1), and Queensland (2).

Calotermes (Figs. 1 and 8): Small to very large species: imago with ocelli, pronotum large, reniform, arched, wing margins without hairs, larger veins crowded towards anterior border (sub-genus *Neotermes*), remaining veins usually very indistinct, empodium present between claws, cerci 2-jointed. Soldier: Head large, much longer than wide, more or less parallel on sides, mandibles large, with stout teeth on the inner margin, pronotum very large, reniform, wider than head, very few hairs on head, thorax and abdomen, empodium present, cerci, two-jointed.

Calotermes insularis (White): A large, yellow species: length with wings 25.50, without wings 14.00, expanse of

wings up to 45.00. Soldier: Total length about 15.00, head with mandibles 7.00; head orange-rufous, with long, slender mandibles; antennæ 15-17 joints, third joint very little larger than second and fourth (sub-genus *Neotermes*).

This is the species referred to by French in "Destructive Insects of Victoria," Part 2, as *Termes australis*, Walker. Lives in small colonies in living trees; found in various parts of Southern Victoria; winged forms present in January.

Calotermes oldfieldi, Hill: Length with wings 15.00, without wings 9.00; a yellowish-brown species, distinguished from the preceding species in the winged form by its smaller size, the median vein of the forewing midway between the cubitus and radial sector, weakly chitinized (sub-genus *Calotermes*), and in the soldier caste by its smaller size (total length 11.50, head with mandibles about 4.50); antennæ 13-18-jointed, third joint much larger than second and fourth, club-shaped (sub-genus *Calotermes*).

Lives in living and dead trees; winged forms present from February to July; has been found at Keilor and in the Mallee district.

Calotermes iridipennis, Frogg: Length with wings 11.00, without wings 7.00; antenna 15-jointed. Distinguished from either of the above by its smaller size, very dark-brown colour, dark iridescent wings and absence of short diagonal branches from the radial sector towards the costal margin (sub-genus *Glyptotermes*). Soldier: Total length 9.00-10.00, head with mandibles 3.15-4.10; head orange-rufous, long and cylindrical; mandibles short and stout; antennæ 13-15-jointed. Distinguished from the preceding species by its smaller size, cylindrical head and shorter mandibles.

Found in living and dead trees, in fairly large colonies, generally with several kings and queens. It is a destructive species in the public gardens of the city and suburbs, and has been found at Beaconsfield and Frankston.

Calotermes rufnotum, Hill: Length with wings 9.00-9.50, without wings 4.50; head and pronotum orange, wings dark fuscous, remainder of insect nearly black. Distinguished from the preceding species by its smaller size, colour of head and pronotum, and presence of short, oblique veins extending from the radial sector towards costal margin. Soldier: Total length 6.50, head with mandibles 2.20; head long and narrow, cylindrical, mandibles short and stout.

Lives in small colonies, in living or dead trees; sometimes attacks building timber; has been taken in the vicinity of Melbourne, Gembrook and Lakes Entrance.

Porotermes: Medium to large, light-brownish species, almost devoid of hairs. Imago without ocelli, pronotum small, reniform, not markedly arched; principal wing veins crowded together near costal margin; numerous small, oblique veins extending from the radial sector towards the costal margin; no empodium between claws; cerci five-jointed. Soldier: Medium to very large size, with broad, flattened head, powerful mandibles, with two very large teeth on apical half of each; eyes pale, rudimentary; pronotum of moderate size, but much narrower than head; no empodium; cerci five-jointed.

Porotermes adamsoni, Frogg: Length with wings 14.00-15.00, without wings 7.00-8.00. Soldier: Total length 8.75-11.25, head with mandibles 3.36-4.67.

Lives in colonies of moderate size, in living or dead trees; winged forms present in March. Has been found in suburbs of Melbourne, and at Ringwood, Tarwin, and Lakes Entrance.

Porotermes grandis, Holmgren: Winged form not known. Deölated imago (king and queen): Length 9.00-11.25; otherwise similar to preceding species. Soldier: Total length 10.50-14.50, head with mandibles 4.20-7.00; otherwise similar to preceding species.

Found in the mountain and hilly districts of South and South-eastern Victoria. Exceedingly destructive to Eucalypts; remarkable for the variation in size and shape of head of soldiers; possibly a mountain form of the preceding species. One species is known from Tasmania, one from South Africa, and one from Chili.

Leucotermes ferox, Frogg: Length with wings 10.25, without wings 4.50-5.15; small species; upper surface very dark brown, lower surface and legs yellowish; wings fuscous, stumps of forewings much larger than, but not overlapping, those of hindwings; clypeus strongly convex, with medium suture; head round; eyes very small and not projecting; ocelli very small (in certain species only a proportion of the imagos have ocelli, but in this they appear to be invariably present); fontanelle small but distinct, circular, situated posteriorly of an imaginary line joining the posterior margin of the eyes; antennæ 16-jointed; pronotum moderately large, slightly narrower than head, and a little wider than long. Soldier (Fig. 2): Total length 5.00, head with mandibles 2.50; head yellow, long and narrow, with long, sabre-shaped mandibles, without teeth or serrations, excepting at the extreme base of the left mandible, where there is a large thorn-like, blunt tooth only visible in cleared or dissected

specimens; labrum very long, cone-shaped, nearly half as long as mandibles; fontanelle as in imago, situated about midway between apex of mandibles and base of head; antennæ 15-jointed (rarely 16-jointed).

Found in small colonies in dead trees, building timber, under stones and logs, and sometimes in the clayey walls of *Coptotermes*' mounds. It is known from Victoria, New South Wales and South Australia. Eight other species are recorded, from Western Australia, Queensland, and the Northern Territory.

Coptotermes: Small to medium-sized species, very dark-brown or yellowish; head, body, and especially wings, very hairy; 19-jointed antennæ in imago, 16-jointed in soldier, third joint very small. Imago with short, broad labrum, indistinct fontanelle, very short clypeus, without distinct median suture; large eyes and ocelli; pronotum large, a little narrower than head and rather wider than long; stumps of the forewings much larger than, and partly covering, those of the hindwings. Soldier (Fig. 3): With oval, orange-yellow head, black mandibles, long cone-shaped labrum; large fontanelle opening behind the base of the clypeus; long, sabre-shaped mandibles, without teeth or serrations, except near the base of left mandible, where there are a few serrations and a long, thorn-like, blunt tooth, visible only in cleared or dissected specimens.

Easily distinguished from all other genera by the presence of a globule of white, milky secretion from the fontanelle.

Coptotermes sp. (near *acinaciformis*, Frogg.): Length with wings 13.00, without wings 7.50; uniform yellow in colour, excepting head, which is suffused with brown, and wings, which are whitish, with light-brown anterior veins. Soldier: Total length 5.00, head with mandibles 2.40. From Northern Victoria.

Coptotermes sedulus, Hill: Length with wings 15.00, without wings 8.00; very dark-brown above, somewhat paler below; wings dark fuscous. Soldier: Very similar to that of preceding species, but smaller; length of head with mandibles 2.00:

From Southern Victoria. The large earthy mounds and earth-filled crevices and hollows in trees, commonly found in the Ferntree Gully and Gembrook districts, are due to the work of this species. The winged forms leave the colonies in immense numbers on their annual colonising flight, during the day and early evening, about the middle of September. The genus is widely distributed, and contains a large number of closely-allied and very destructive species. The species

under notice has been generally confused with *C. lacteus*, Frogg.

Rhinotermes: Small to medium-sized species, of uniform yellow colour; wings clear and remarkably reticulated with furrows and small veins, the principal veins yellow; eyes and ocelli very large and prominent; fontanelle round, distinct, in line with the ocelli and connected with the clypeus by a distinct furrow; clypeus large, with median suture; head almost hairless; antennae 20-jointed; pronotum large, and a little narrower than head; stumps of the wings hairy, those of the forewings much larger than those of the hindwings, and reaching the base of the latter. Soldier (Fig. 4): Of two distinct forms; head more or less quadrangular; fontanelle circular, distinct, in line with the insertion of the antennae, a deep furrow passing forward from the fontanelle through the clypeus to the apex of the very large labrum, the latter covering the greater part of the mandibles; mandibles long and powerful, with two teeth near the apex of the left and one near the apex of the right. Very easily distinguished from other genera by the above characters.

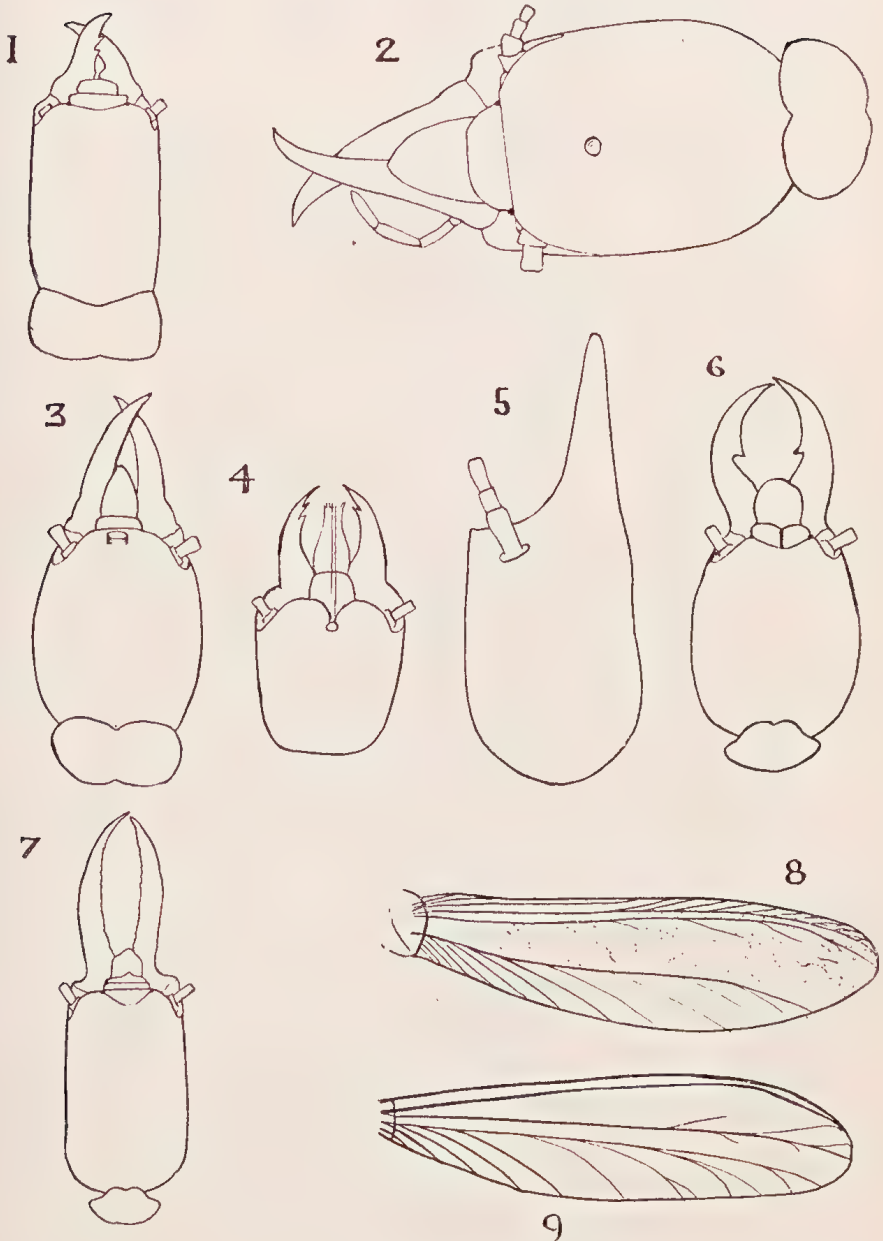
There are two described, and several undescribed, species in Australia, the soldiers of which are very much alike. One unidentified species has been found in North-western Victoria. The genus is widely distributed, and contains very destructive species. Nothing is known of the breeding habits, queens or nests of Australian species. The winged forms leave the parent colony in small numbers, at night, during a period of two or three months.

Eutermes (Figs. 5 and 9): Small to medium-sized species, with medium vein distinctly nearer cubitus than to radius; clypeus large, more than twice as wide as long, and with indistinct median suture; eyes large and prominent; ocelli large; fontanelle elongate, forked anteriorly; antennae 15-jointed; pronotum large, slightly narrower than head. Soldiers with pyriform head, prolonged anteriorly into a rostrum; mouth parts concealed by rostrum.

Eutermes fumigatus, Brauer: Length with wings 13.5, without wings 6.00; dark-brown above, head and wings nearly black, under-surface yellowish-brown. Soldier: Total length 4.50, head to apex of labrum 1.60; head yellow, with orange-rufous rostrum.

This species is found in southern and South-eastern Victoria, generally under logs and stones, in small colonies. The winged forms are present from February to May. Very little is known of its habits, and it is probable that it

PLATE III



VICTORIAN TERMITES.

Heads of Soldiers: (1) Calotermes; (2) Leucotermes; (3) Coptotermes; (4) Rhinotermes; (5) Eutermes; (6) Hamitermes; (7) Microcerotermes. Typical Wings: (8) Calotermes (sub-genus Neotermes); (9) Eutermes.

differs specifically from the New South Wales species described by Brauer. There are several very closely-allied species in Australia, most of which are difficult to separate in the soldier caste, but are markedly different in the winged form.

Eulermes exilisus, Hill: Length with wings 25.00-26.50, without wings 6.50; head very dark-brown, nearly black, thorax and abdomen chestnut brown, clypeus and under-surface yellowish, wings light-brown, with yellowish costal margin; eyes and ocelli very large.

This species is found in Western and North-western Victoria, where it builds small, woody termitaria or mounds generally over the remains of a tree-stump or root. There are several closely-allied Australian species with widely-different habits; some of these have been mistakenly identified as *E. fumipennis*, Walker. The species under notice extends in Western Australia.

Hamitermes wilsoni, var. *victoriensis*, Hill: Length with wings probably about 12.00-13.00, without wings 7.00-8.00; head, thorax and abdomen dark-brown, clypeus lighter brown, labrum and legs yellowish, wings probably dark fuscous; antennæ 15-jointed; eyes small, but very prominent; ocelli small and not very near eyes; fontanelle oval; clypeus large, a little wider than long, with distinct median suture, but not strongly bilobed; pronotum triangular. Soldier: Total length 5.00, head with mandibles about 1.90; head pale yellow, a little larger than wide; clypeus strongly bilobed; labrum large and covering about one-third of mandibles; mandibles sickle-shaped, with a large tooth on each, about the middle. (Fig. 6.)

An imperfectly-known species, found in small colonies, under stones, near Preston.

Microcerotermes: Very small species, with small eyes and small ocelli; no fontanelle; 14-jointed antennæ, and narrow fuscous wings. Soldier (Fig. 7): With long, narrow head, large conical labrum, 13-jointed antennæ; long, slender, curved mandibles, finely serrated along entire length of inner margin, but without teeth.

Soldier and workers only of two species have been found in drier districts of Victoria. In these castes they appear to be identical with Northern Territory and South Australian species, descriptions of which have not yet been published. Fourteen species are known from Australia, many of which are very destructive. All are wood-eaters; some build small cone-shaped, woody termitaria.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART XIII.

BY J. C. GOUDIE.

(Read before the Field Naturalists' Club of Victoria,
July 15, 1925.)

CURCULIONIDÆ.

Belus flindersi, Blackb. This species was omitted from the list in a previous paper.

BRENTIDÆ.

- 5639 *Cordus hospes*, Germ. The only representative we have of this family, which is closely allied to Curculionidæ, differing in the position of the rostrum, which is not turned down, and in having moniliform, non-angulated antennæ. It is about $\frac{1}{2}$ -inch in length, very narrow, of a dark-red colour, and often occurs in ants' nests.

ANTHRIBIDÆ.

5670. *Aræocerus fasciculatus*, De Geer, var. *sambucinus*, Boisd. A small, brownish, mottled beetle, found under bark on dead trees. Another species, as yet unidentified, was obtained from the dried stems of Marsh Mallow, *Lavatera plebeja*, at Green Lake.

CERAMBYCIDÆ.

The Larvæ of Longicorns are wood-borers, tunnelling in the branches, stems and roots of many species of trees and shrubs, often killing them outright. It is a common occurrence to find a sapling, or a long branch, tunnelled throughout its length by a single Longicorn grub. Being very numerous and widely-distributed, these larvæ do great damage to our native timbers, as often they exist for two or three years in the wood. They pupate in a chamber, formed generally at the end of the tunnel, the perfect beetles gnawing their way out in the spring or summer. The oval-shaped exit-holes are characteristic signs that a tree has been attacked by either Longicorn or Buprestid beetles. The larvæ of some species are preyed upon by a small Ichneumon wasp, which, with its long, bristle-like ovipositor, is able to pierce the bark and lay its eggs on or in the body of its victim. From a pupa of *Scollecobrotus variegatus*, Blackb., I once obtained six of these parasitic wasps.

Some of our largest and most formidable-looking beetles belong to this family, as well as many of slender and graceful appearance. They are generally nocturnal in habits, at least so far as the use of their wings is concerned, being found, by day, either clinging to the branches of their food-plant, or hiding under the loose bark of trees.

5680. *Macrotoma servilis*, Pasc.

5691. *Cnemoplites impar*, Newm.

These are two of our largest species, measuring up to $2\frac{3}{8}$ inches in length. They are similar in appearance, being of a dark-reddish-brown colour, and have the outer margins of the sub-quadrate prothorax finely serrated. They breed in Mallee-butts and roots, also in the Black Box, *E. bicolor*. The large, yellowish-white larvæ were considered a *bon-bouche* by the blacks, while anglers find them a useful bait.

5718. *Pachydissus sericus*, Newm. A fairly common coastal species, of which I have taken only one example in the Mallee; this specimen measures $\frac{3}{4}$ -inch, which is about half the size of typical specimens. It is dark-brown, with a silky sheen.

5726. *Phacodes obscurus*, Fabr. A brown beetle, about 1 inch in length, with greyish, mottled markings on the elytra. On the disc of the strongly-rounded prothorax are three small but distinct tubercles.

5729. *Æbarina tristis*, Pasc. A small, narrow, brownish insect, with short, slender antennæ.

Phoracantha posticalis, Blackb.

5743. *P. punctata*, Don.

5744. *P. quinaria*, Newm.

5745. *P. recurva*, Newm.

5746. *P. semipunctata*, Fabr.

P. senio, Newm.

5748. *P. tricuspis*, Newm.

The species of *Phoracantha* are, perhaps, more commonly met with than any other of our Longicorns. Under the loose bark of trees, especially those in blossom about midsummer, some of them are found in numbers. They are mostly of a yellowish tint, with dark-brown or black transverse, zig-zag bands on the elytra. The long, slender antennæ are armed with acute spines on many of the joints, and there is a lateral spine on the prothorax. *P. tricuspis*, one of the largest, is about $1\frac{1}{2}$ inches in length. It breeds in the Black Box. The other species also attack this tree, as well as the Mallee; in fact, hardly a tree of any kind escapes them.

5755. *Trypocharia odewahni*, Pase. This is rare locally; it is $1\frac{1}{2}$ inches in length, dull dark-brown, without markings, rugose and strongly punctured.

5761. *Atesta angasi*, Pase.

A. tatei, Blackb.

These are similar in appearance; slender, reddish-brown, with an inconspicuous yellow spot near the middle of each elytron. *A. angasi* is $\frac{3}{4}$ -inch in length; *A. tatei*, smaller, and much darker, the yellow spot more obsolete.

5767. *Coplocercus aberrans*, Newm.

5773. *C. rubripes*, Boisd.

C. aberrans is long and slender, nearly 1 inch in length, pale reddish-yellow, with three irregular dark bands across the elytra. *C. rubripes* is smaller and darker, about one-third of the apex of elytra (except a very small yellow spot at extreme apex) being nearly black. All the femora are much thickened, and red.

5780. *Sisyrrium ibidionoides*, Pase. A small, pale-yellowish species, with head, apex of elytra and two ante-medial spots black, of which I obtained a single specimen.

5799. *Callidiopis scutellaris*, Fabr. Is uniform dark-reddish-brown, $\frac{1}{2}$ -inch long. The small, but distinct, yellow scutellum helps to identify this species.

Aposites niger, Blackb. A decidedly rare species. It is uniformly dull-black, long and slender, with prominent mandibles and eyes, and is upwards of an inch in length. The antennæ are flattened, each joint, except the two first and last joints, produced at apex to form a short spur or tooth. Taken on the wing at dusk.

5828. *Exarreta unicolor*, Pase. I have found this beetle breeding in the wood of the Bull-oak, *Casuarina luehmanni*. It is pale-yellow, without markings, and is about $\frac{1}{2}$ -inch in length.

5831. *Bebius filiformis*, Pase. One of our smallest species, being slightly over $\frac{1}{4}$ -inch in length, very narrow and almost parallel-sided. It is light-reddish-brown in colour.

Scolecobrotus variegatus, Blackb. By many collectors this is regarded as merely a variety of *S. westwoodi*, Hope, one of the most destructive of the "branch-cutting" Longicorns. It is about 1 inch in length, reddish-brown, with a dark blotch on the elytra behind the shoulders. In the males the 12-jointed antennæ are strongly serrated.

Many years ago D. Best gave a very interesting account* of this beetle, and the larva's method of working. He stated that, although the beetle is fairly common, yet it is rarely captured in the ordinary way, but must be reared from the wood. This coincides with my experience.

Uracanthus albatrus, Lea.

U. discicollis, Lea.

U. loranthi, Lea.

5840. *U. strigosus*, Pasc.

5841. *U. triangularis*, Hope.

In his tabulation of the *Uracanthides*† Lea records 28 species of this genus from various parts of Australia and Tasmania. They are long, narrow beetles, generally of some shade of reddish-brown, with pale clothing, taking the form, in some species, of vittæ on the prothorax or elytra, or both. *U. triangularis* is readily distinguished by a bare, triangular patch on the elytra behind the shoulders. It is about 1 inch in length. The other (local) species are smaller. They breed in the wood of various Eucalypts, Wattles, etc.; *U. loranthi* in the small branches of the Bull-oak; *U. discicollis*, in the Broom Ti-tree.

5848. *Rhagiomorphia concolor*, W. S. Mael. This purplish-red species, which measures $\frac{3}{4}$ -inch, has two faint, pale vittæ on the elytra, near the suture. The first joint of antennæ long, abruptly thickened at the apex; second joint very short; third nearly as long as first, with a tuft of black hair at apex. It is rare in this district, but common about the Dividing Range, where often it attacks the Blue Gum, *E. globulus*.

5855. *Tritocosmia paradoxa*, Pasc. A very rare species in this district, though it occurs more frequently in Gippsland and in New South Wales. It is black, with the elytra, which are distinctly "ribbed," pale-yellowish-red. The antennæ are thickened at apex of first and third joints.

5869. *Sylletus grammicus*, Newm. A very slender Longicorn, $\frac{1}{2}$ -inch in length, with a dark-red prothorax and head, the elytra brown, with three thin, grey, longitudinal lines on each. I have taken it on the flowers of the Black-thorn or Prickly Box, *Bursaria spinosa*.

5892. *Bimia bicolor*, White. This fine species is seldom seen. It is about 1 inch in length; the antennæ, middle part of head, disc of prothorax, scutellum, hind legs, tibia and tarsi of other legs and under parts of body black,

*Vic. Nat., Vol. XIV, p. 146.

†Trans. Roy. Soc., S.A., XL, 1916, p. 368.

the elytra, which are of a thin, "papery" texture, and the remaining parts being pale orange. It breeds in several species of Mallee, its presence being indicated by roughly circular depressions, about $1\frac{1}{2}$ inches in diameter. The bark having been eaten away, the wood is exposed, and in the centre of the depression will be found a small, plugged-up hole, where the grub has entered the wood. A coloured plate in French's "Destructive Insects of Victoria," Part IV, of *B. femoralis*, illustrates this process, the habits of both species being the same. *B. bicolor* usually appears in September.

5899. *Agapete kreusleri*, Pasc. On a casual inspection this species might be mistaken for one of the Hymenoptera, the short, pointed, pale-coloured elytra leaving the flight-wings, which are not folded when at rest, exposed. It is $\frac{1}{2}$ -inch in length, black, with the head, front of prothorax, and a band across the abdomen reddish-yellow.

5902. *Earinus mimulus*, Pasc., var. *unifasciata*, Lea. A pretty and scarce Longicorn, taken on Mallee blossom. It is $\frac{1}{2}$ -inch in length, with black head, legs, and antennæ, red prothorax, and dark-blue elytra. Marked at about apical third with a transverse yellow band.

5918. *Hesthesis cingulata*, Kirby.

5923. *H. plorator*, Pasc. •

These curious beetles seem to have been designed by Nature to pass as Flower-wasps; the short, almost obsolete elytra, long flight-wings, black-and-white ringed body being well calculated to deceive, especially when the insects are seen on flowering shrubs, as is usual. *Cingulata* is about 1 inch in length; *plorator* much smaller. Both are rare.

5931. *Distichocera par*, Newm. The male of this rare species has flabellated antennæ, which are thickened towards the tips. I have taken only one specimen, which measures $\frac{3}{8}$ -inch. It is dark-chocolate-brown, with faint whitish vittæ on prothorax and elytra, the latter being narrowed to apex and strongly carinated.

5934. *Eroschema poweri*, Pasc. This species is black, with yellowish-red, ribbed elytra. Several of the basal joints of the antennæ are clothed with tufts of black hair. Superficially resembles some of the Malacodermidæ, in whose company often it is found, on flowers; it is $\frac{5}{8}$ -inch in length.

Brachytria thoracica, V. de Poll. One of our rarest and prettiest species, measuring about $\frac{3}{8}$ -inch. The

head, front of prothorax, femora (except tips) and basal part of elytra are reddish-yellow, remainder of prothorax and legs black. About the middle of elytra is a whitish, transverse band, from which, to the apex, the colour is black, with shades of purple. My single specimen was obtained from a dead branch of the Bull-oak.

5943. *Pempsamacra dispersa*, Newm. A greyish-brown, mottled beetle, with comparatively short antennæ. It is $\frac{3}{8}$ -inch in length, and is found, during the day, on flowering shrubs.
5987. *Ischnotes bakewelli*, Pase. A narrow, dark-brown beetle, about $\frac{3}{4}$ -inch in length; somewhat cylindrical in shape; rare in the Mallee.
6011. *Microtragus mormon*, Pase. This species is remarkable in that it resembles, both in appearance (except the antennæ) and habits, the Amycterides, or ground Weevils. It is about 1 inch in length, rather stoutly built, of a greyish-brown colour; the prothorax rugose, strongly punctured, with a short lateral spine. The elytra have each a prominent tubercle at the base, and two almost tuberculate, curved ridges, not reaching apex. It is apterous, and lives entirely on the ground, on or under logs, in which the larvæ feed. When ready to pupate, the larvæ enter the soil, and form oval cocoons composed of gnawed wood and sand, from which the perfect beetles emerge in February. The species has a wide range, being found also in Western Australia.
6079. *Ancila (Hebecerus) marginicollis*, Boisd. Like many other insects, this used to be common on the wattle scrub, but with the clearing of hundreds of square miles of Mallee is now seldom seen. It is under $\frac{1}{2}$ -inch in length, mottled and speckled grey and brown, and has the outer margins of prothorax yellow.
6128. *Symphyletes lateralis*, Pase.
6135. *S. pubiventris*, Pase.
6146. *S. vestigialis*, Pase.

These handsome beetles have a decided preference for the acacias, the larvæ boring in the branches, and the beetles subsisting on the bark. *S. lateralis*, which is (or was) fairly common, is about $\frac{3}{8}$ -inch in length, light-reddish-brown, with a paler, irregular stripe on the suture, and a silvery stripe on outer margin of elytra. *S. pubiventris* is larger; the general colour grey, freckled with small black spots, and marked on the elytra with ten white spots, two

being on suture. A rare species. *S. vestigialis*, about the same size, has the prothorax marked with alternate rings of black and white; the elytra are thickly speckled with black spots, and have a narrow, silvery stripe, on outer margin. It breeds in the Umbrella Acacia, *A. oswaldi*, cutting perfect rings in the bark round the smaller branches, so that the portion above soon dies.

6151. *Platymopsis armatula*, White. Fresh specimens of this are very attractive in appearance, being of a creamy-grey colour, with dark, oblique markings in the form of an X on basal half of elytra; there is a transverse band at about apical third, and a large black spot near the middle of outer margins of elytra, which are also studded with scattered clumps of small black spines or tubercles. It breeds in the smaller branches of the Black Box, *Eucalyptus bicolor*, a tree more commonly known as the "Swamp-box." The beetle measures $\frac{3}{4}$ -inch in length.

6161. *Penthea picta*, Pasc. This species is of rare occurrence; the single specimen in my collection was taken on a Salt-bush plain at Ballapur. It is $\frac{5}{8}$ -inch in length, the general colour greyish-brown, the antennae rather short. Front of prothorax marked with a whitish ring. The elytra are mottled and blotched with dark-brown, and have two silvery-white, transverse markings (reaching outer margins but not suture), and another of the same colour on the base.

6176. *Rhytiphora latifasciata*, Pasc.? I have a specimen which may be this species, but as it is in poor condition, having been found dead and broken, in its tunnel in a branch of the Black Box, a doubt must be recorded. The insect is chocolate-brown, with a wide, pale, transverse band extending from behind shoulders to about apical third of elytra. It is about an inch in length.

6198. *Corrhenes paulla*, Germ. This species breeds in the wattles, such as *Acacia hakeoides*. It is $\frac{3}{8}$ -inch in length, fawn-coloured, with dull, white markings on the prothorax and elytra. Some specimens have a distinct dark oblique mark at about apical third of elytra.

In addition to the above there is a species of *Bethelium*, which breeds in the Murray Pine, *Callitris verrucosa*; one of *Uracanthus*; one of *Phoracantha*, and one of *Didymocantha*, which have not been identified.

I am indebted to Mr. Chas. Oke for the names of some species in this list, and for other assistance generously given.

ANTS AND THEIR GUESTS.

BY H. W. DAVEY, F.E.S.

The study of Myrmecophiles, or Ant-guests, is fascinating. The field is wide, and we have tilled only a small corner of it yet, in Australia.

When one examines an ants' nest for the first time, in quest of "guests," it is to experience surprise that so many little creatures dwell among ants. Some are persecuted, others tolerated, or welcome, boarders. Probably, in many instances, acarids will be most in evidence, when a nest is opened or uncovered. It is, perhaps, the presence of these mites, in large numbers, that makes beetles, such as *Nepharis* of the *Colydiidae*, and *Polylobus*, *Dabra*, and others of the *Staphylinidae*, welcome guests.

When I was working out the symbiotic relationship existing between the Lycaenid butterfly, *Miletus ignita*, and the ant, *Iridomyrmex nitidus*, it was necessary to keep colonies of the ants in captivity. Proof was obtained that the ants could not, or would not, free themselves from the attacks of mites. In the course of a few weeks some ants had so many mites fastened to their legs and body segments as almost to prevent them from walking. Yet they made no attempt whatever to dislodge the pests; nor were there any signs of mutual aid. The explanation may be that the ants, in natural conditions, depend upon inclines to remove the parasites.

The association of *Miletus ignita* and *Iridomyrmex nitidus* affords an excellent example of Symbiosis. The caterpillars of this butterfly feed at night, on the leaves of the Golden Wattle, *Acacia pycnantha*, and are accompanied by ants, which return with them later, to the nest, where the caterpillars remain during the daytime, clustered together in one of the lower galleries. The symbiotic relationship is as follows: The caterpillar is sheltered in the ants' nest during the larval and pupal stages (emerging direct from the nest, in due time, as a butterfly), and protected at night, when feeding, from attacks by predatory insects. In payment for this service, the ants enjoy meals of "honeydew," excreted from the anal segment of the caterpillar. But in this, too, the ants are serving their guest, for if the excreted liquid were not removed from it the caterpillar's body would become fouled, and would be attacked by entomogenous fungi, resulting in death.

In the nests of some species of ants (*Collembola*, or Spring-tails, *Lipura* species, for example, are found. The *Thysanura*, of the same order, *Aptera*, are often represented by a species of *Lepisma*. These insects are unable to jump, but they are swift-footed. These insects, and the blind beetles, *Rodwayias*, of the family *Trichopterygidae*, appear to be welcome guests, and may benefit the ants by keeping down the growths of moulds and other fungi in the nest.

The *Pselaphidae* and *Staphylinidae* are, undoubtedly, welcome guests, and probably the *Scydmanidae* are, too. Beetles of the first two families may supply excretory matter, upon which the ants feed, but are possibly most useful in keeping down mites, etc. The species of *Chlamydopsis* are most certainly hostile, although their epaulits have the appearance of excretory organs. If they are not hostile, it is difficult to understand the need for protection: they are able to tuck away tarsi and legs completely, also the head and antennae. In addition, species are wonderfully protected by mimicry, both in shape and colour. *Chlamydopsis granulata*, Lea, when frightened and "closed up," bears a strong resemblance to the large head of a *Phcidols* soldier ant of the species, in a nest of which it lives.

Beetles of the families *Ptinidae* and *Dermestidae* probably are scavengers. Species of *Ptinidae* are, occasionally, plentiful in many nests; the family *Dermestidae* often is represented by larvæ only. Large nests, especially those having old-established ant-cemeteries or dumps, are frequented by these insects.

Among myrmecophilous insects may be mentioned the curious beetle *Cordus hospes*, which occasionally is so numerous as to form patches of colour in the nest. It is difficult to determine whether these *Brenthids* are friends or foes; probably they are welcome guests. Beetles belonging to the family *Tenebrionidae* may be found occasionally in ants' nests: the *Scarabæidae* frequently are represented by species of *Cryptodus*, the larvæ of which probably feed on the vegetable matter in ants' nests.

The order *Hymenoptera* is represented by tiny Chalcid wasps; there need be little doubt as to their intentions. Orthopterous insects often are to be seen running through a nest, the commonest being a small, stoutly-built, but pallid, cricket, and some small *Blattidae*. The latter may be welcome; for bees allow a small species of cockroach to wander through their hives unmolested.

Diptera may be present in the shape of larvæ of one of the *Syrphid* flies of the *Microdontinae*. *Walhalla* appears to be

much favoured by these extraordinary larvæ, as on several occasions I have found them in nests of the small black ants so common in that locality. They are so unlike the larvæ of any order of insects that, when first discovered, they were supposed to be small molluscs, and were actually described as such, under the generic names *Parmula* and *Scutelligera*. I reared a series of *Microdon* larvæ and pupæ, found at Ararat, and the flies later were described by the Bureau of Entomology, Washington, D.C., being named *Microdon Daveyi*.

Curious little creatures of the class Arachnida, of the order Phalangidea, I have taken from the nests of the large Bull-dog Ant, *Myrmecia forficata*. These Harvestmen may have been present accidentally, but as they have been found on three or four occasions, in nests of this ant, it appears likely that they visit the nests in search of acarids, etc. Their stink-glands would protect them from attack by the ants.

Of the many peculiar acarians inhabiting ants' nests probably *Ptocharus Daveyi*, Silvestri, is one of the most aberrant, owing to the very unusual length of the first pair of legs.

It is not surprising to find members of the Coccidæ in ant-nests, as with many insects belonging to this family, ants have a symbiotic relationship.

"THE STRANGER" ROCK, DERRINAL.

Thirty-three years ago the late Dr. T. S. Hall read before our Club a short paper on "The Glacial Beds Near Heathcote" (*Victorian Naturalist*, viii, p. 172), and in it referred to the "Special Report on the Glacial Conglomerate of Wild Duck Creek," by Mr. E. J. Dunn, F.G.S., of the Mines Department, Victoria, and the rock at Derrinal, known as "The Stranger." On Easter Monday last Mr. and Mrs. V. Miller, Mr. J. H. Harvey, and I visited Derrinal, travelling by rail to Heathcote.

The Heathcote district possesses many geological features of great interest, which have been discussed in various publications from time to time. Derrinal is five miles away. "The Stranger" is a stranded rock, about a mile and a half from the station. We started off along the railway line (in the direction of Bendigo). Soon after crossing the Mount Ida Creek, we saw evidences of glacial action in a small cutting, through which the railway passed, striated

pebbles and pieces of rock embedded in the glacial hill. A little further ahead, on our left, was seen a large, flat stone on the slope of a hill, which proved to be "The Stranger." It is a tabular mass of coarse-grained granite, about 16 ft. 6 in. by 10 ft. 6 in., and 5 ft. thick; estimated weight, about 30 tons. The remarkable feature of the rock is the smoothness of its present upper surface, which is attributed to the fact that it was planed by ice action many thousands of years ago. Round about are several other fair-sized stones, evidently of the same origin, and hence known as "Erratics." Quite underneath the stone grow plants of the little Neck-



"The Stranger" Rock.

lace Fern, *Asplenium flabellifolium*, apparently in such a position as to receive no moisture, except from a very driving south-west rain.

Ascending to the summit of the hill we reached a plateau, which had at one time been cultivated. Here we found numerous specimens of striated pebbles, and pieces of rock, but the most of them were too heavy to carry far, previous visitors having probably selected the more portable specimens. "Dunn's Rock," a striated surface of Ordovician, lies about two miles away, to the west. It was named by Sir Baldwin Spencer, after Mr. E. J. Dunn. Some members of our party reached the ruins of a sandstone house of fair

dimensions, on the crest of a hill overlooking the Wild Duck Creek valley. This had once been the homestead of Moorabee Station, held in 1853 by Mr. J. H. Patterson (see "Letters from Victorian Pioneers," page 16). The sandstone of the house was obtained from a cliff on the Wild Duck Creek, not far away. This vantage point, about 1000 ft. above sea level, affords a fine view of the surrounding country: Mt. Alexander, near Castlemaine, the Green Hill, near Kyneton, and the western end of the Macedon range. The illustration of "The Stranger" gives its appearance, as seen from the south-west.—F. G. A. BARNARD.

NATIONAL MUSEUM NOTES.

NAUTILUS FROM VICTORIAN WATERS.

The unusual occurrence of two species of *Nautilus* on the Victorian coast is interesting.

In January, 1920, two very badly-broken shells were found by Miss G. Nethercote, on the ocean beach, on the isthmus connecting Wilson's Promontory with the mainland. One of these, now in the possession of Mr. C. J. Gabriel, proves to be *Nautilus macromphalus*. In May last another specimen (*N. pompilius*) was found on the three-mile beach, on the eastern coast of the Promontory, by Mr. W. H. Ferguson, and given by him to the National Museum. The shell, though unbroken, was much abraded and quite devoid of the usual colour markings.

Mr. Gabriel informs me that he received a description of a shell picked up, a few years ago, near the Nobbies, off Phillip Island. From the description, this, in his opinion, was undoubtedly a species of *Nautilus*. So far as I am aware, this animal has not been found in a living state on the eastern coast, further south than North Queensland. One species (*N. pompilius*) is recorded from West Australia.

The question arises as to the occurrence of these shells so far south on our coast. From personal observations, during the last 15 years, material thrown overboard from the eastern coastal boats, and those from Tasmania, after passing the southern end of Wilson's Promontory, is washed up on the beaches from Oberon Bay to some miles north of Darby River. Frequently great quantities of fruit, such as bananas,

oranges, etc., among other objects, are washed up on the beaches, showing that the trend of the current is in this direction. During the recent war I, personally, found, along these western beaches, a number of bottles, containing notes from departing soldiers.

The inference, therefore, is that these discarded shells, which, as shown by experiments, would float in deep water for a considerable time, have been thrown overboard from some vessel—presumably from the northern states—and have drifted to the localities stated.

JAS. A. KERSHAW, Curator.

EVICTIIONS IN BIRDLAND.

In a secluded gully near the Olinda reservoir, Mooroolbark, a male Owlet Nightjar, *Egotheles novae-hollandiae*, had its home, in a hollow limb of a small, dead tree. For more than two years it was flushed, at intervals; but one day there was no response to my knocking on the tree. Looking into the hollow, I saw two eggs of the White-throated Tree-creeper, *Climacteris scandens*. They were partly covered with opossum fur, but were cold. The Tree-creeper were not seen. A week later the eggs were still there, completely covered in fur, and pieces of charcoal from the inner wall of the hollow. There was evidence that another bird had been camping there, as the material covering the eggs was well pressed down. It now appeared obvious that, during the absence of the Owlet Nightjar, a pair of White-throated Tree-creeper selected the hollow for their nest, but after the eggs had been deposited the former occupant reappeared and forced the intruders to seek a new "home." A few weeks later the Owlet Nightjar again took possession of its old home, and remained there for several months, until the tree was destroyed by fire. Mr. A. J. Campbell records a similar instance of an Owlet Nightjar taking possession of a hollow after a pair of Tree-creeper had laid their eggs in it. These records indicate that the Owlet Nightjar is often the enemy of small birds who rear their brood in hollow boughs.—D. DICKISON.

Mr. C. Oke's name should have been included in the list of authors of papers given in the Annual report published in July, 1925, *Naturalist*. In his paper, "New Australian Coleoptera," May issue, p. 14, line 5, should read "six segments in F. and seven in M."

Field Naturalists' Club of Victoria

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EXHIBITION OF WILD FLOWERS,

St. Kilda Town Hall, Tuesday, 22nd September, 1925.

(Open Afternoon and Evening)

Remember, one half of the receipts is for the benefit of the Bush Nursing League. Members and friends are requested to assist by obtaining Wild Flowers for the Exhibition. Large quantities and all kinds of native flowers are required for display and sale. To economise time in setting-out flowers at the hall, when forwarding, endeavour to keep *each species separate* in bunches, the stems being well wrapped in *damp paper* or cloths, and the flowers placed in air-tight, wooden or tin boxes lined with paper. *Do not sprinkle water over the blooms.* Country consignments should be forwarded to reach Melbourne by last trains on Monday, 21st September, addressed—

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Spencer St. Railway Station,

Melbourne.

(Cut Flowers—Perishable)

with *name and address* of sender legibly marked thereon.

NOTE.—Railway freight will be paid *at this end*.

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— OF —

The Field Naturalists' Club of Victoria

Published 11th September, 1925

Hon. Editor : CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th SEPTEMBER, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—

PROPOSER.

SECONDER.

Miss Jean Harvie,
Chanak Street,
East Malvern.

Mr. E. E. Pescott
F.L.S.

Mr. C. French, Jun.

Miss C. Piper,
Black Street,
Brighton.

Mr. E. E. Pescott
F.L.S.

Mr. C. French, Jun.

Mrs. F. Chapman,
Threadneedle Street,
Balwyn.

Mr. F. Chapman,
A.L.S.

Mr. G. Coghill.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. By Mr. A. E. Keep, The Royal Botanic Gardens, Kew, England.
2. By Mr. J. Clark, "Victorian Ants," Part II.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

EXHIBITION OF WILD-FLOWERS.

Club members are requested by the Committee to help in connection with the Exhibition of Wild-Flowers, to be held in the St. Kilda Town Hall on Tuesday, September 22, 1925. Tickets are now available, and each Melbourne member, perhaps, can sell a number to friends. Country members can help, too. Please read again the notice in last issue of *Naturalist*.

The Victorian Naturalist

VOL. XLII.—No. 5. SEPTEMBER 11, 1925. No. 501.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, August 10, 1925. The President, Mr. Geo. Coghill, occupied the chair, and about 45 members and friends were present.

CORRESPONDENCE AND REPORTS.

A birch-bark post-card was received from Miss R. S. Chisholm, Canada, who sent greetings to fellow-members. Mr. F. Pitcher read a report of the excursion to Mount Morton, and the President spoke of the outing to Mitcham.

ELECTION.

On a ballot being taken Miss G. Simpson, 42 Glendearg Grove, Malvern, was elected as an ordinary member of the Club.

PAPER.

"Habits of the Sand-Wasp," by L. G. Chandler. The author described the habits of a common wasp that burrows in the sand, and paralyses "cut-worm" caterpillars, as food for its larva. Messrs. Coghill, C. Barrett, C. French, junr., and C. Oke discussed the paper.

PRESENTATION TO MR. BARNARD.

The meeting adjourned to the lower hall, where refreshments were provided, and a presentation was made to Mr. F. G. A. Barnard, in recognition of his highly-valued services to the Club during nearly 40 years.

The President said that members had gathered to do honour to a fellow-member, who was a "Father of the Club." He had served it in various offices, and for 32 years as Hon. Editor of the *Naturalist*.

Mr. F. Pitcher, an original member, spoke of Mr. Barnard's splendid work for the Club; of his readiness always

to give advice and help to others; and his unrivalled knowledge of Club history, etc.

Mr. C. Daley read extracts from several letters selected from a number received, all written in appreciation of Mr. Barnard's services. Mr. Daley then, on behalf of the subscribers, presented a wallet of notes to Mr. Barnard.

Mr. Barnard, in returning thanks, said that the Club had been his hobby. It had been a pleasure to serve it. He related some incidents in the Club's early history.

Mrs. Barnard also spoke.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—A Miocene Coral, *Orbicella tasmaniensis*, Duncan sp., from Flinders, Vic. A first record (by Rev. Geo. Cox) from this locality; also Green Flowering Gum, *Eucalyptus Lehmannii*, grown at Balwyn.

By Mr. C. French, Jun.—Five specimens of a remarkable Coccid (scale insect), *Apiomorpha munita*, male and female, collected in the Dandenong Ranges, 18/7/25.

By Mr. E. R. Hammet—Seed-pod of Cassia, grown Kilkevan, Queensland.

By Mr. V. Miller—Fungi from Sherbrooke Gully, Belgrave, Vic.

By Mr. F. Pitcher—Distinctive pink and white form of the Native Heath, *Epacris impressa*, collected during Mt. Morton excursion, 18/7/25.

By Mr. A. L. Scott—Quartz crystal from garden in Caulfield; the imperfectly-formed faces being worthy of notice.

By Mr. H. B. Williamson, F.L.S.—Wild-flowers from Foster, including white specimens of *Sprengelia incarnata*, F.v.M., the Pink Swamp Heath, collected by Mr. F. Barton, Jun.; also specimens of *Pultenaea styphelioides*, F.v.M., and species recently described; *Pultenaea subternata*, H.B.W., N.S.W.; *P. trichophylla*, H.B.W., S.A.; and *P. pubescens*, H.B.W., S.A., and Vic.

By Mr. E. E. Pescott, F.L.S.—Herbarium specimens of the Western form of the Banded Greenhood, *Pterostylis vittata*, F.v.M., from W.A.; flowering specimens of the Grampians Heath Myrtle, *Thryptomene Mitchelliana*, F.v.M. (cultivated); various specimens of aboriginal stone axes, some grooved for hafting, from the Southern Coast of Victoria (recent collections).

HABITS OF THE SAND-WASP.

BY L. G. CHANDLER.

(Communicated by C. Barrett)

(Read before the Field Naturalists' Club of Victoria, August 10, 1925)

North-west Victoria is particularly rich in wasps and other insects of the order Hymenoptera. The genial climate of this sunny corner of the State is, no doubt, the main cause of their presence in such numbers and variety. Wasps, though fascinating insects, have had little attention paid to them in Australia.

With the object of interesting especially the younger members of the Club, I shall describe the habits of the wasp, *Ammophila suspiciosa*. My notes, by no means complete, for they have been gathered in moments stolen from pressing work, may serve as an introduction to the study of the species. *Ammophila* means "lover of the sand." It is a title euphonious and well applied; though perhaps almost any species of wasp that burrows in this region could, with justice, bear the same name.

The Sand-Wasp, like most wasps that dig a perpendicular burrow, prefers a firm soil in which to begin its excavating, and the beaten paths used by man, and the head-lands in a vineyard, are much favoured by it. The loose, sandy soil of the vineyard itself, is one of its favourite hunting grounds. And as its prey is invariably a caterpillar of the Bogong Moth, *Agrotis spina*, or allied species, known to the man on the land as "cutworms," it is obvious that the wasp is of economic importance. About September, when the vines are beginning to shoot, the cut-worm pest, especially in a newly-planted vineyard, frequently assumes serious proportions; and were it not for the effective check kept upon these caterpillars by certain species of birds and insects, the lot of the grower would be unbearable. The same applies, but with even greater force, to the wheat-grower, for, unlike the horticulturist, he cannot protect himself by the application of poison-baits and sprays.

The "balance of Nature" is very wonderful; and almost simultaneously with the appearance of the cut-worm cater-

pillars *Ammophila* leaves her winter's prison in the ground as a perfect insect. Perfect, that is, in all but wing-development; and very soon the tiny, double wings become expanded to their full size. Love-making over, the wasp, between visits to flowers in search of nectar, applies herself to the capture and paralysis of cut-worms, and the perpetuation of her race. Should the day be cold and cloudy, her activities as a huntress are temporarily checked, for, like butterflies, wasps are lovers of sunlight. At night they take shelter in post-holes and hollow trees, and, on cold mornings, remain concealed until the sun tempts them forth.

The cut-worm larva is a night-feeder, and before daylight it burrows into the soil, perhaps a quarter or half an inch below the surface. In a vineyard the horticulturist can often note its presence by the disturbed condition of the soil; but the wasp apparently finds it by some other method, in which her antennæ play an important part.

When hunting, the course of the wasp, to an onlooker, appears to be very erratic. In her wanderings often she goes over the same area again and again. With antennæ tapping the ground, she pauses, burrows, moves on, burrows again; and so the hunt continues—sometimes fruitlessly if the game be scarce—for half an hour or more. It seems fairly certain that where she burrows a cut-worm has been concealed, or is then in hiding, but probably at too great a depth for her to make a successful capture. So far, I have failed to find a cut-worm at such places, but with other species of wasps, particularly a small member of the genus *Pompilius*, a spider huntress, I have had sufficient proof to convince me that the wasp has a sure method of locating her hidden prey. It is probable that the insect is endowed with a sense of which we have no knowledge. Those delicate, waving antennæ surely hold the secret that baffles my understanding!

The presence of her prey can hardly be detected by the wasp by sound, unless her organs of hearing are extremely delicate, for the cut-worm lies perfectly still. On the other hand, it is doubtful whether scent is the determining factor. Time and again, I have placed a cut-worm in the path of a wasp intent on hunting, and she has passed within a few inches, or walked right across it. On the surface of the soil, and quiescent, the caterpillar was merely an obstruction in her path. Had it moved she might have recognised it as her usual game. If smell were the deciding sense, she would have immediately seized and paralysed the cut-worm when

walking across its body. That she did not recognise her prey by sight alone is not strange. The sight of a wasp for *still* objects is not particularly good, and, moreover, her instinct tells her to seek for the cut-worm beneath the soil. The soil in conjunction with the antennae acts as a medium whereby the presence of her quarry is transmitted to the wasp's brain, but in what way I do not know.

Ammophila suspeciosa is a solitary species. Provided that the soil is firm enough to burrow into; her wants for the site of the home for her grub are satisfied. She first captures and paralyzes her game, and then, within a few yards, excavates a perpendicular burrow about an inch and a half in depth. Branching off at the bottom is a cell just large enough to accommodate the caterpillar. The varying methods adopted by individual members of the species from the time when the caterpillar is captured until the burrow is finally closed are somewhat remarkable. When I first observed these variations, I thought, maybe, I had met with two distinct species, but a close examination revealed the wasps to be identical.

In this variation of habits, there is one outstanding feature. In one case the wasp, after she has paralyzed her prey, places it off the ground, on vegetation, while she constructs the burrow for its reception; in the other case, she buries it temporarily by raking sand over it with her forefeet. I have had no evidence as yet to show that the one individual is capable of adopting either method according to her fancy, and, unfortunately, I have not had the necessary time to devote to continuous observation and experiment, whereby this point might be settled. It is certainly full of delightful possibilities, as it would go a long way towards proving whether the wasp is bound rigidly in her actions by instinct, or whether she is guided to a limited extent by reason.

Quoting from my note-book, I will deal, first, with the case of a wasp that temporarily buries its prey:—

8/11/24.—“About 4.30 p.m. I noticed cut-worm wasp digging a burrow. She was bringing up pellets of earth supported between her mandibles and front legs, and as she reached the top of the burrow, walking backwards, she would throw the earth behind her with a quick action, and immediately go below again. As the burrow neared completion, it took her from four to seven seconds per trip. Several times she left her task, and took aimless walks around the neighbourhood, pausing occasionally to sun and groom:

herself. On returning to the burrow she exhibited signs of nervousness, and seemed afraid to go below. I was puzzled by these actions until I observed a small, brown ant near the entrance to the burrow. The wasp was very scared of the tiny ant, and jumped into the air when she saw it at close quarters. The same thing happened when she blundered across a line of ants in her wandering. Finally, she came back to the burrow, made several attempts to go below, hesitated, descended about half the length of her own body, and backed out and resumed her wandering. I was surprised when she stopped at a small heap of sand an inch from the burrow, and, after scratching, a paralysed cut-worm lay revealed. This was my first glimpse of this procedure, for previous wasps that I had studied had placed their game on vegetation.

“Seizing the cut-worm by the body near the head, and clasping it belly to belly with the aid of her front legs, she carried it to a distance of about four yards. Placing it on the ground, she again raked sand over it with her fore-feet, and after more wandering she returned and began a burrow two inches away. I accidentally disturbed her, and she began on another. After ten minutes’ work she abandoned this also, as apparently not to her liking—perhaps a root had interfered with her work—and resumed her wandering. A fussy, particular wasp, this! In a few more minutes she picked another spot, two feet from caterpillar, and energetically set to work. The mandibles and fore-feet are used in conjunction, the feet—unlike a dog, that scratches the earth back one foot at the time—being operated together.

“As she bit at the earth she hummed, but the humming ceased as she backed with her load or swept it away with her feet. Three times during the excavation, which occupied half an hour, she carefully groomed the moist sand from her face, body, legs and antennæ. In her endeavour to clean her hind-legs she frequently overbalanced and fell on her back, owing to her legs becoming temporarily entangled. Her middle pair of legs are cleaned independently by the front pair; likewise the face and antennæ. Balancing on the front pair of legs, and one middle—usually the right middle—the hind pair of legs, together, would be rubbed up and down on the free middle leg, and to gain additional balance the wasp often put its head on the ground. It was while engaged in cleaning this back pair of legs that the interlocking of the joints happened, and caused the upsetting of her equilibrium.

“During these grooming operations she wandered within

a radius of several feet from the burrow, and at times scratched more sand over her capture. The moist sand adhering to her annoyed her like water sometimes annoys a dog. As the dog rubs itself on the grass to remove the water, so the wasp rubbed herself against the dry, surface sand, with the object of removing the moist sand. When sunning herself, she kept her body flat on the ground, and the middle pair of legs, and frequently all the legs were held at an angle above the body.

"At twenty minutes from the time of beginning the burrow, she gave herself the second complete cleaning; and, after a brief wander, came to the caterpillar, partly uncovered it as though to assure herself that it was still there, and then covered it again with sand. Returning to the burrow, she brought a few more loads of earth from below. All the earth was deposited on the one side, and, unlike many members of her species, she did not trouble to rake the pile backward to clear a space for further deposits. Consequently, as she descended, she occasionally took as much down as she brought to the top. However, the job was eventually completed to her satisfaction, and, after another grooming she spread her legs at an angle above her body, and, except for a continual movement of the abdomen in and out, lay motionless, resting and enjoying the sun.

"Suddenly she went to the cut-worm, deftly uncovered it, and, seizing it in the same position as before, she transported it to the burrow. A little manœuvring to place the head in position over the burrow, and she squeezed past and descended, head first, to the bottom. In a few seconds she ascended, for the first time, head first, and, grasping the paralysed creature by the head, pulled it below. A minute passed, and she had arranged the provender in the desired position, laid an egg upon it, and ascended to the surface. A small quantity of earth was swept backward into the hole, and she descended to push it into position with her head. This procedure continued until the burrow was almost full, when she selected small pebbles and bits of chips, and placed them, one by one, into the hole, raking further loose earth, between the trips, with the larger fragments. Several times, while holding a small chip in her mandibles, she pressed the soil into position, often picking up the same piece or using another bit that happened to be closer. A final sweeping of about two inches from all sides of the burrow, and the job was finished. All traces of the burrow had disappeared, and the wasp, retiring a few feet, again completed her toilet before flying away."

The most interesting fact about this observation is, that the wasp is, in reality, an implement-user.

The Peckhams, in their admirable work on American wasps ("Wasps, Social and Solitary"), describe how *Ammodontia urnaria* uses a stone to pound down earth over her nest-burrow: "She improvised a tool and made intelligent use of it."

There is a considerable difference in the methods of wasps at work. Some are particularly fussy about their toilet, and often excavate several burrows before they are satisfied with the conditions. Their dread of ants, which frequently raid their game at the unguarded moment when it is lying exposed, is often responsible for this, and some resent the intrusion of a human being. The ants, once they have a good grip on the leg of a wasp, are hard to dislodge, and the wasp has probably had experience on this point. Other specimens I have noted are very thorough in their work, taking care to sweep the soil well back from the burrow, so that there is ample room for fresh deposits. Of their toilet they take little heed; the work in hand is all-absorbing for the moment; and all their movements are methodical and thorough.

It seems strange, on first thought, that wasps should be so particular in the choice of their game. Nearly every order of insects, and also spiders, appears to have its own special wasp enemy. If there is any variation at all as regards the kind of insect captured, it will be found, in most cases, to be a species closely allied to that generally favoured. The reason for this is apparent, when we consider the hunting methods of the wasp, and particularly her manner of paralyzing her prey.

Describing the nervous system of an insect in his book, "Insects: Their Life Histories and Habits," my friend, Harold Bastin, says:—"Beneath the digestive canal (not above it, as in the case of vertebrate animals) passes the central nervous chain of the insect. This is composed of twin cords which connect a series of paired knobs called ganglia. Roughly speaking, each pair of ganglia may be likened to a minor brain, which governs the activities of the parts that immediately surround it. This arrangement accounts for the curious disconnectedness of action, which is observable in a maimed insect." By her marvellous instinct the wasp has a full knowledge of the vital nerve-centres of her game, but apparently only within the limited range of a genus, wherein the nervous system is more or less identical.

This explains why her choice in selection is limited to certain species.

In some insects, owing to the grouping of the ganglia being close together, one stab is sufficient to cause paralysis. The slayer of such an insect, if faced with the problem of reducing a cut-worm to a stage of helplessness, where the prey has to be stung in several nerve-centres in succession, would have no knowledge of how to proceed. Her art in the use of the sting, so perfect and uncanny in its application, is highly specialised, and therefore limited in scope. But let me proceed with the method of the *Ammophila*, and the variations that accompany that method.

The actual paralysis of the victim is produced in two distinct operations. But first there is the digging out of the cut-worm. Having located its position, the wasp sets to work, in frenzied haste, biting and pulling at the soil, and roots of grass, etc., that obstruct, and throwing the soil behind her in a shower. First on one side, then on the other, she digs, without pause, until the cut-worm lies exposed. Then, without a moment's hesitation, she seizes the writhing creature near the head, and, curving her abdomen, plunges the sting between the first and second pair of legs. Now, withdrawing her sting, and bending her body a little more, she attacks the first segment near the base of the mouth. The cut-worm is now at her mercy. It can still wriggle the hind portion of its body, but it cannot move from the spot. The wasp, as though realising this, leaves it for a while, and arranges her toilet. In the struggle, and hasty digging, she has numerous grains of sand adhering to her; and, as described earlier, she has certain ways of removing the annoyance.

Fabre, who has explained the habits of French wasps so lucidly, considers that the rolling about of the *Ammophila*, after the close of the first act in the paralysis of her victim, is, in effect, "a manifestation of delight" in the conquest. I cannot agree with this, for I have seen the same manoeuvre when the wasp was merely engaged in cleaning herself. As stated previously, it is simply an interlocking of the joints of her hind and middle legs, and this upsets her balance. Her toilet completed, she again mounts the cut-worm and stings it between the second and third pair of legs; moving a little, she takes a fresh grip with her mandibles; and stings it in the next segment. Still another movement backward, and the sting is inserted between the first and second pair of pro-legs. Sometimes only four nerve-centres are attacked, never more than five, according to my observations. As to

the exact points attacked, I find that I have the above positions stated in three places in my note-book, but on account of the sting being thrust underneath the caterpillar it is difficult to determine the exact spot where it enters.

The paralysis complete, the wasp gently squeezes with her mandibles near the head of the game, sometimes from above, sometimes laterally. This action causes sickness in the cut-worm, and for several minutes the wasp eagerly laps up the juices with her tongue. I have observed a wasp, on returning to the leaf where she had placed her game, and, finding it not quite paralysed to her fancy, again sting it in a few places. One wasp began at the anterior end, but, seeming to realise her mistake, she turned around, and attacked it in the orthodox manner.

That some wasps are less skilful than others is evident. I have kept numerous paralysed caterpillars to determine the period of hatching of wasps' eggs, the method of feeding of young wasp, etc. In one case the stung creature partly revived, and, turning completely over, detached and damaged the egg. In another instance the young wasp hatched, and began its meal; but it was obvious that the provender was dead. In two days the young wasp was also dead, poisoned by the decomposing food. This is the only note I have where the wasp had made such a fatal mistake. I did not observe the stinging in this case, so that I am unable to account for the blunder.

In order to determine whether the wasp is capable of reasoning, I have conducted certain experiments. A record of these, and an account of the development of the wasp-grub to the adult stage, etc., may be given in a future article. My thanks are due to Mr. F. E. Wilson for identifying specimens of wasps that I have forwarded to him.

EXCURSION TO MOUNT MORTON, BELGRAVE.

Four members took part in the excursion to Mount Morton, on 18th August. We followed the pathway from the east end of Belgrave station, by which the road journey to South Belgrave is shortened to the extent of about a mile. This pathway passes the recreation reserve, and leads on to the recently-deviated Country Roads Board road to the bridge over

the Monbulk Creek, about half a mile below the Monbulk Reservoir. Crossing the bridge, we made a short cut up the hill through Lockwood Estate, to a creek, and ascended the hill which leads up to Mount Morton. On this hill-slope, to the north, is one of the finest heath grounds among these easily accessible from the city. In June and July the white, pink, and deep crimson native heaths, and their various shades, are to be seen in profusion. One form, in which pink and white flowers appear united, has been very pronounced, although not abundant, each time I have visited the hill. This area, about three miles by road from Belgrave, has hitherto been preserved from destruction, but now that a motor-car track, branching off from the main road to Narre Warren, has been formed to Mount Morton, it may become less attractive to heath lovers.

Walking through the heath, in a westerly direction for nearly half a mile, we came to the cone-shaped peak of Mount Morton, which, with the exception of a few small Black Wattle and Blackwood trees, and "Manuka" shrubs, *Leptospermum scoparium*, scattered about, and grass and bracken, is bare of vegetation. The mount, computed to be between 800 feet and 900 feet in height, was, until recently, owned privately, but the Ferntree Gully Shire Council wisely purchased an area of four acres, including the mount, and reserved it for public use. The view from the summit is extensive, embracing French and Philip Islands and Western Port Bay, the Strezlecki Ranges, the Baw Baws, portions of Warburton Ranges, Dandenong Forests, Macedon, Melbourne, Port Phillip Bay, the You Yangs, the Heads and Mornington Peninsula, with all the intervening areas.

Nothing unusual in the mountain and valley vegetation was noted, and very few flowers were seen, excepting the heath. Some healthy young plants of the Myrtle Acacia, *A. myrtifolia*, were observed in full bloom and bud. The predominating acacias in the district traversed, in addition to the Silver Wattles in the valleys, are the Leper and Hop Acacias, *A. leprosa* and *A. stricta*, and Prickly Moses, *A. verticillata*. Instead of returning by the new road, we took the old one, from Monbulk Creek, and for nearly a mile of the journey were serenaded by Bell-birds, *Manorhina melanophrys*, whose haunts are in the vicinity of the reservoir which we passed. Their musical notes were delightful.

MOSSES OF WILSON'S PROMONTORY.

BY J. R. LESLIE.

I had originally intended to present this paper on Mosses, collected during January, 1925, in the National Park, Wilson's Promontory, some time in February, but in attempting to work up the species found the task of identification much more difficult than I had expected. Very little is known of Victorian Mosses, and what has been recorded is dispersed through various journals and fragmentary publications, which often are difficult of access. In the determination of the following species, I have made considerable use of Rodway's excellent "Mosses and Hepatics of Tasmania," as being the most reliable guide having any close connection with the Victorian forms. I have also referred to Braithwaite's "British Moss Flora," "Hookers' Flora Tasmaniae," and, for some generic determinations, to Engler and Prantl's "Pflanzenfamilien." Although every care has been taken, a few errors probably will have crept in, and must be corrected later.

The humid, forest-clad, eastern slopes of the National Park form one of the finest areas in Victoria for the growth of Bryophyta (Mosses and Hepatics), and we may confidently expect to find about 400 species (including Hepatics) within it. The Park has practically never been explored for non-vascular cryptogamo, and future investigations will doubtless lead to very interesting results. The only instance, so far as I am aware, of mosses being definitely recorded from the area in question is in Baron Von Mueller's Australian Mosses—a work of 20 well-executed plates—where two species, *Hypnum callidioides* and *Conostomum perpusillum*, are recorded from Sealers' Cove; neither of these species was collected last January.

I have not attempted to give popular names in the subjoined preliminary list as these are not very definitely applied, and usually suggest little. The Hepatics have been excluded—although about 80 species were collected—on account of the great difficulty in determining the species satisfactorily. There are still some 20 species of mosses remaining to be identified, but these must be added to the list at some future date. Among them are some very interesting, and possibly new, forms.

TORTULACEÆ

Barbula rubella (Hoff.), Mitt.
Weissia, sp.

FUNARIACEÆ

Funaria hygrometrica (L.)
Sibth.

DICRANACEÆ

Ditrichum affine, C.M.
Campylopus pudicus, Hornsch
torquatus, Mitt.
capillatus, H.f. et W.
Dicranum spp. (none collected)
Ceratodon purpureus (L.), Brid.

HYPNACEÆ

Mniodendron comosum (Lab.)
comatum (C.M.)
Hypnodendron spininervum
(Hook)
Rhaphidostegium homomallum
(Hpe.)
Hypnum aristatum, H.f. et W.
Ptychomnion aciculare (Brid.)
Mitt.
Thuidium, spp.

LEUCOBRYACEÆ

Leucobryum candidum, Hpe.

GRIMMIACEÆ

Grimmia, sp.
Orthotrichum, sp.
Zygodon, sp.

NECKERACEÆ

Hedwigidium imberbis (Sm.)

PTERYGOPHYLLACEÆ

Pterygophyllum nigellum
(H.f.W.), Jæg.
Distichophyllum
microcarpum (Hedw.)

FISSIDENTACEÆ

Fissidens pallidus, H.f. et W.

BRYACEÆ

Bryum bimum, Schreb.

LOPIDIACEÆ

Lopidium pallens (H.f. et W.)
Racomium cristatum
Cyathophorum bulbosum
(Hedw.), C.M.

BARTRAMIACEÆ

Bartramia, sp.

POLYTRICHACEÆ

Catharinea Muelleri
(Hpe. et C.M.)
Polytrichadelphus majellanicus
(Hedw.), Mitt.
Dawsonia superba, Grev.
Polytrichum juniperinum, L.

SPLACHNACEÆ

Tayloria octoblephara (Hook)
Mitt.

REPRINTS FROM *NATURALIST*.

The author of a paper published in the *Naturalist* is entitled to receive 25 reprints free, if the Editor has been notified not later than a fortnight after the meeting at which such paper was read. But, in view of the high cost of printing, the Committee hopes that reprints of general papers, such as accounts of holiday trips, will not be asked for by the writers. In future, reprints will not be supplied unless they are ordered.—EDITOR.

THE FLORA OF BASS STRAIT.

On the occasion of the visit of members of the R.A.O.U. to the Furneaux Group, in November, 1912, the writer was one of the party which camped at Lady Barron, on Flinders Island. As the result of excursions made in the southern part of the island from a point east of the camp to Strzelecki Peak, rather more than 300 plants were noted or collected. Since then a search, which cannot be said to be exhaustive, was made for records of plants from this and the other islands of Bass Strait with the object of compiling a census. This has been done, and, though it cannot find a place here, it seems worth while to set down the sources from which data were obtained, and to make some remarks regarding certain species and their distribution.

From the *Flora Australiensis* one gathers that Robert Brown, Gunn, Milligan, Bynoe and others were the earliest collectors in the islands; Brown and Bauer, Baron von Mueller tells us, were in King Island as early as 1802. Backhouse, in his *Narrative*, mentions about a dozen species seen on Flinders Island during his three visits there, in 1832. Probably the first list of plants from any of the islands to be published accompanies the Baron's paper on "The Vegetation of King's Island," in the Proceedings of the Royal Society of Tasmania for 1881. This was made from material sent to him by the light-keeper there. In the 1884 volume of the same "A Complete Census of the Flora of Deal Island"—60 species—appeared, and doubtless here also the light-keeper was prompted to make the collection.

The reports of three excursions undertaken by the members of this Club contributed greatly to our knowledge of the natural history of the island, and though the bird life seems to have engaged most of the attention of the visitors, plants were not neglected.

The first of these excursions to King Island, in 1887, resulted in the collection of such plants as enabled the Baron to publish in the *Naturalist* a list, including 16 introduced weeds, of 204 species which considerably exceeded that previously made by him. The item most interesting to him was a small composite *Nablonium calyceroides*, described by Cassini, in 1825, from a specimen from the same locality.



ROOKERY OF WHITE-BREASTED CORMORANTS (Storehouse Island, Bass Strait)
Photo, C. Barrett]

The second excursion was to Kent Group, in 1890, when the material submitted to the Baron led to the addition of 23 species to the Deal Island census.

The visit to the Furneaux Group, in 1893, was not so fruitful in plant records, for of the collection submitted to the Baron only a dozen were mentioned as being the more important.

In the account of the late Mr. E. D. Atkinson's visit to the Three Hummocks Island, in the *Naturalist* for February-March, 1890, the names of four plants occur, and 10 in that of the late Mr. J. Gabriel's risky venture to Albatross Island, in the *Naturalist*, for January, 1895. The islands, belonging politically to Tasmania, their plants are included in Rodway's *Tasmanian Flora*, but only the minority are described vaguely, as from "Bass Straits." Spicer, in his *Handbook*, is more definite, and generally mentions the particular island in which the species occurs.

From these sources, then, one is able to make up a list of 458 plants indigenous to the islands—340 occurring in the Furneaux Group, 214 in King Island, 121 in the Kent Group and 14 in the Hunter Group. The particular localities of some ten are still undefined.

These figures will, of course, be greatly increased when the northern part of Flinders Island, the southern, more densely forested, portion of King Island, which was not explored by the excursionists of 1887, Cape Barren and other islands, are more closely investigated.

On examining the list we find, as might be expected, that the great majority of the species are common to the adjacent parts both of Tasmania and the mainland. Those which are not—and as will be seen twenty-one do not extend to Tasmania and ten are not found north of the Strait—appear below. Two only are known from a single island.

Other species appear to have "jumped" the coastal districts as, for example, *Zygophyllum apiculatum* and *Spyridium eriocephalum* from our North-West to Flinders Island and *Papaver aculeatum* to King Island.

It is interesting also to find *Elæocarpus reticulatus*, from the one side, and *Phyllocladus rhomboidalis*, from the other, meeting in King Island. The presence, again, of *Melaleuca squamea*, *M. gibbosa* and *M. decessata* in Flinders Island is unexpected.

Occasionally records give rise to some doubt as when we see *Leptospermum myrtifolium*, *Oxalis magellanica* and *Epacris heteronenia* attributed to Flinders Island. The latter is also supposed to yield two Acacias, one absent from

PLANT	TAS.	ISLANDS	AUSTRALIA	
<i>Zygophyllum apiculatum</i> , F.v.M.	—	Flinders	W.A., S.A.,	Vic., N.S.W., Q.
<i>Myoporum humile</i> , R.Br.	—	"	W.A., S.A.,	Vic., N.S.W.
<i>Hakea flexilis</i> , F.v.M.	—	"	S.A.,	Vic., N.S.W.
* <i>Acacia oxycedrus</i> , Sieb.	—	"	S.A.,	Vic., N.S.W.
<i>Isopogon ceratophyllus</i> , R.Br.	—	"	S.A.,	Vic., N.S.W.
<i>Scaevola microcarpa</i> , Cav.	—	"	S.A.,	Vic., N.S.W., Q.
* <i>Melaleuca decussata</i> , R.Br.	—	"	S.A.,	Vic.
* <i>Thelymitra grandiflora</i> , Fitz.	—	"	S.A.,	Vic.
<i>Pseudanthus ovatifolius</i> , F.v.M.	—	"	Vic.,	N.S.W., Q.
<i>Pimelea axiflora</i> , F.v.M.	—	"	Vic.,	N.S.W.
<i>Zoysia pungens</i> , Willd.	—	King, Flinders	Vic.,	N.S.W., Q.
<i>Polypompholyx tenella</i> , Lehm.	—	"	Vic.	N.S.W., Q.
<i>Cotula filifolia</i> , Thunb.	—	"	W.A., S.A.,	Vic., N.S.W., Q.
<i>Sicyos angulata</i> , L.	—	"	W.A., S.A.,	Vic., N.S.W., Q.
* <i>Scaevola suaveolens</i> , R.Br.	—	Sister Islands	Vic.,	N.S.W.
<i>Etacocarpus reticulatus</i> , Sm.	—	King	Vic.,	N.S.W., Q.
<i>Podotheca angustifolia</i> , Cass.	—	"	S.A.,	Vic., N.S.W., Q.
<i>Pastorina bicuspidata</i> , Benth.	—	"	Vic.,	N.S.W., Q.
<i>Acacia crassiuscula</i> , Wendl.	—	Flinders	W.A., S.A.,	N.S.W., Q.
<i>Didymotheca thesioides</i> , Hook.	—	"	W.A., S.A.,	N.S.W., Q.
<i>Ixiolaena supina</i> , F.v.M.	—	Kent, Flinders	S.A.,	N.S.W., Q.
<i>Lasiopectatum discolor</i> , Hook.	Tas.	Kent	W.A., S.A.,	N.S.W., Q.
<i>Hibbertia hirsuta</i> , Benth.	"	Hummock Island	S.A.,	N.S.W., Q.
<i>Nablonium calyceroides</i> , DC.	"	Flinders	S.A.,	N.S.W., Q.
<i>Schoenus fluitans</i> , L.	"	King, Flinders	S.A.,	N.S.W., Q.
<i>Lomatia tinctoria</i> , R.Br.	"	Flinders	—	—
<i>Ozothamnus Gunnii</i> , Hook.	"	"	—	—
<i>Bedfordia linearis</i> , DC.	"	"	—	—
<i>Pimelea cinerea</i> , R.Br.	"	"	—	—
<i>Phyllocladus rhomboidalis</i> , Rich.	"	"	—	—
<i>Thryptomena micrantha</i> , Hook.	"	Kent	—	—
<i>Centrolepis pulvinata</i> , Desf.	"	Islands, Bass Strait	—	—
<i>Pratia irrigua</i> , Benth.	—	Kent	—	—
	—	"	—	—

our State, *A. crassiusculus*, Wenol., which is perhaps *A. adunca*, A.Cunn., and *A. siculiformis*, no found in our southern districts.

A very striking shortage in species of Eucalyptus is evident. In Flinders Island we noted only *E. amygdalina* and *E. globulus*, the former scrubby but the latter making a fine unmixed forest, averaging perhaps one hundred feet high. These two, with *E. viminalis*, are reported from King Island, and the first-mentioned and *E. obliqua* from the Kent Group.

A most interesting deficiency shared with Tasmania is the absence of any Loranth in the islands, and also of the beautiful little bird, *Dicalum hirundinaceum*, which is considered to be responsible for the spread of the pest.

A matter worth mentioning, perhaps, is the occurrence of *Goodenia ovata*, always an unattractive shrub, in a particularly objectionable shape, in the northern slope of Strezlecki Peak. Here, on rocky, broken ground, it was growing thickly over a wide area, with single, unbranched stems, about four or five feet high, quite unlike the bushy form it assumes with us, and it proved extremely difficult to traverse.

Until more complete plant lists of the island are available it is rather futile to make comparisons. The fauna is considered more akin to that of Tasmania, but the flora appears to be rather Australian.

The plant covers of the islands are seemingly remnants of the vegetation once continuous across the Strait, and the 33 plants listed above represent brokenly the limits of the range of the species.—C.S.S.

NATURAL HISTORY IN AUSTRALIAN ENCYCLOPEDIA.

Many articles on the native fauna and flora are included in Vol. I of the "Illustrated Australian Encyclopædia," an invaluable work recently published by Messrs. Angus and Robertson Ltd., Sydney. They are by leading authorities, and are finely illustrated. Descriptions are given of a large number of plants, mammals, birds, reptiles, insects, etc., and many species are figured. There are coloured plates of birds and birds' eggs, typical insects of different orders, lizards, snakes and frogs, fishes and Australian seaweeds. As an example of the articles, that on Beetles may be mentioned. It occupies about five pages, and 12 species are figured on a half-tone plate. The whole work is admirable, and the natural history sections should do much to popularise our favourite subjects throughout the Commonwealth.—C.B.

ABORIGINAL STONE-AXES.

BY EDWARD E. PESCOTT, F.L.S.

“Axe” is a term generally applied by the average man to any piece of stone which an aboriginal has taken, and, sharpening, more or less, one end, put to the various uses to which, in his so-called primitive mind it would, be of value to him. The aboriginal might need to hollow out a charred log for a canoe, or an elbow of a tree for a “coolamon,” make toe-grips in a tree for climbing, or strip off slabs of bark for his canoe, or for his mia-mia. He would, in all these and other cases, use the implement which we collectively call an axe. Being a “stone man,” his implements or axes are all made of stone.

“Any stone will make an axe,” seems to have been the motto of this “stone man,” for he was able to take and use any piece of stone, and shape, not “mould” it, to his purpose. If he were in basaltic country he would smash off pieces of basalt and select those that seemed to him most shapely; diorite stone was especially favoured, and of this stone many very fine axes were made. Any hard stone that came in his way was used; thus we have axes of chialstolite slate, gneiss, hard sandstone, limestone cores, and even flint. The Murray men and the inland tribes used water-worn pebbles of all sizes, “gibbers” from the desert country, and hard sandstone pebbles from the open plains.

The making of an axe from a water-worn pebble was a simple matter. The craftsman would simply select an oval, or elongated, pebble, and, by rubbing both sides of one end on a hard or rough stone, gradually work it down to an “edge.” This grooved, grinding stone he, perhaps, carried about with him, or he may have had some rock-face to which he regularly repaired, a permanent sharpening station.

Usually the stone was ground down on both faces; but occasionally a wedge-shaped axe is found, made usually from a water-worn stone, which has been “sharpened” on one side only. Such axes are uncommon; and one of this kind in my collection has had the wedge-side chipped down instead of being ground. Such implements are more akin to the New Zealand axes and chisels, which are almost invariably chisel-shaped, instead of having both sides worked down.

The "modern" axe-maker—called the Neolithic man—would, after grinding down his axe-edge, bring it to a state of very smooth polish. Some of these axes have been polished to an almost incredible degree of smoothness. Diorite axes were very frequently polished. Some have the whole surface beautifully smoothed and polished. These were evidently used as hand-axes, and were not "hafted" or "handled."

In some parts of Australia there were tribes which included some very clever artificers, for the axes carry a groove which has been chipped or hammered out with a piece of stone, the groove completely circling the axe. This groove materially assisted in gripping the handle to the stone. In the Melbourne Museum there is such an axe having two grooves, the maker of which was truly a Tubal Cain among his associates. Other axes made by superior craftsmen had the whole of their surface "bossed" over, the maker hammering it with a stone, as a stonemason hammers and works down the rough surfaces of stone. Then the edge was ground down and polished.

The hafting of the axe, or the fixing on of a handle, was an important operation. A fairly thin strip of pliant tree-stem, averaging from 18 inches to 20 inches in length, and about an inch in width, was flattened somewhat on one edge. In Northern Queensland cane from the "Lawyer" palms was used. This strip was rendered supple by heating, and then bent in half, the axe being folded in the bend. The handle then was tied in position with string made from grass fibre, or from animal or human hair. The "hafter" next heated near the fire some of the gum, or resin, which he had collected as an exudation from the grass-trees. This grass-tree gum, after being well kneaded, was fastened, by pressing, all over the butt-end of the axe and around the handle, being worked and plastered until the stone axe was firmly fixed to the wooden handle. Occasionally the axe and handle were smeared over with red ochre or white limestone. Then it was ready for use. "Hafted" axes are very rare, the wood and resin readily disintegrating and decaying in the soil in a few years.

Axes are to be found almost all over Victoria. Along the coast where "middens" abound, the places where the blacks fed on shellfish, leaving the remains in great heaps; wherever they had their "kitchen" or "burial" middens; wherever animal life was abundant; by rivers and lakes, where fish could be obtained—these are the places where axes still

await the collector. Whenever they are found they should be treasured, for, with other stone implements and weapons, they are the sole monuments or memorials of a fast-decaying race—the “stone men” who lived in the days of modern electric and steel era.

LINKS WITH THE PAST.

The National Herbarium, Melbourne, has an extensive collection of Australian plants, gathered by Sir Joseph Banks and Dr. Solander. These links with the past were presented by the British Museum authorities.

On 28th April, 1770, Captain Cook's scientific companions of the famous voyage botanised on the shores of Botany Bay. The first specimen collected was one “which was large, yielding a gum, much like *Sanguis draconis*”—probably a *Eucalyptus* species. Several trees, which bore a fruit of the “*Jambosa* kind (*Eugenia*) in colour, much resembling cherries,” were also noted on that day. By 3rd May 200 quires of blotting paper had been used for drying the plants collected. The paper was made into book form.

The voyage was continued northward, and, landing at Bustard Bay, Banks and Solander collected *Pandanus*, *Ficus*, *Heteropogon*, *contortus*, etc. On 10th June the “*Endeavour*” struck a coral reef, part of which became embedded in her planks, thus preventing disaster. Many of the specimens stored in the hold were badly damaged. It was necessary to beach the ship on the banks of the stream now known as Endeavour River. The accident proved to be a blessing in disguise, as it gave the scientists much time for collecting plants. Once, their specimens were in danger, owing to a fire lighted by the aborigines.

Among the numerous species collected were the following:—*Hibiscus tiliaceus*, *Semecarpus australiensis*, “The Marking Nut,” *Glycine speciosa*, *Tetragona cornuta*, *Ficus caudiciflora*, *Cycas media*, *Livistonia australis*, *Eucalyptu* species, *Xanthorrhœa*, *Casuarina suberosa*, *Trichodesma zeylanica*, *Stylidium graminifolium*, *Isopogon anemonifolius*, *Beyeria opaca*, *Helichrysum apiculatum*, *Callistemon lanceolatus*, *Banksia serrata* (a genus named in honour of Banks), *Cassia mimosioides* and *Adiantum æthiopicum*, “Maiden Hair Fern.”—J.W.A. and P.F.M.



BIRD ISLES OF BASS STRAIT.

Australia has its bird isles, not less wonderful in their way than those of Peru, concerning which a book has been published recently. Our Club, in the days of its youth, revealed a spirit more adventurous than that of its middle age, and carried out expeditions to the Bass Strait islands. The results were notable:

Why should we not go again to those isles of the sea? I have been twice among them, and commend the voyage, with many landings, to Club members, who would see "at home" Gannets and Gulls, Albatrosses, Petrels and the big, sea-faring Cormorants, that long bore the name of Gould (priority has decreed the change from *Phalacrocorax gouldi* to *P. fluscescens*.)

On Cat Island the Gannets, *Sula serrator*, nest in numbers, as they did more than 30 years ago, when a party of F.N.C. members explored the Furneaux Group. Three bird isles lie off the east coast of Flinders—Babel, Cat and Storehouse; the last-named is a nesting haunt of White-breasted Cormorants. Our pioneer fellow-members of the 1893 expedition saw them there, among the nests on granite terraces; and when, with other naturalists, I landed on Storehouse in November, 1908, the rookery was in occupation. Perhaps it is flourishing still; though there have been many changes in "island life" during recent years.

From 300 to 400 nests formed the Cormorants' rookery in November, 1893, but in 1908 the number was about 150. The population, doubtless, varies much from season to season. Nature herself may take toll of the birds, in various ways; and Cormorants are not protected against human enemies.

The group-photograph (Plate IV) was obtained after careful stalking. The Cormorants were wary; yet their neighbours, the Gannets, of Cat Island, declined to leave their nests when we walked among them.—C.B.

BEES' WINTER HARVEST.

Some years ago, on a sunny day in late winter, scholars under my charge at Hawkesdale, in the Western District, noticed bees (a colony was always kept in the school garden) flying in great numbers around the Golden Wattles, *Acacia pycnantha*, in the garden. A boy picked a phyllode and put it to his lips. His shout, "Honey!" was the signal for a rush of scholars to the trees. Investigating, I found that sweet liquid was exuding from the gland, a little swelling on the edge of the phyllode. I mentioned the matter to the late Mr. L. T. Chambers, an expert in bee management, who stated that he had noticed a similar occurrence at one of his apiaries, but the result of my subsequent enquiries shows that few people have seen bees feeding on nectar from these glands. In a paper contributed to the *Naturalist* (Nov., 1913), Mr. Reginald Kelly gives his views, and the results of his observations on the function of *Acacia* leaf glands. He failed to detect any sweet exudation, and his conclusion was that these organs perform excretory functions, that the secretions are neither fluid nor viscid, and that they are not strictly glands or nectaries, in the sense that the term gland or nectary does not accurately describe the nature of the growth. He suggests the name "vents," and writes of them as mere "functionless relics."—H.B.W.

HOW THE BLACK AND WHITE FANTAIL BUILDS ITS NEST.

Probably none of the smaller native birds has been more closely and lovingly studied than the Black-and-White Fantail, *Rhipidura leucophrys*; but I have read no account of one of its unique habits in nest-building. Since the end of September, 1921, I have made notes on eight nests, all, I believe, built by the same pair of birds. Nine nests were constructed, but I was unable to find the second one of the season 1922-23. Last season three nests were built, one early in October, the next in November, and the third at the end of December. All but two of the nests under observation were built in pine trees, *Pinus insignis*, one or other of a group, usually at a height of 8 feet.

The felt of cobweb, which forms the nest foundation and looks like a slight thickening of a thin, grey branch, is spread in position by the bird's head. Very often I have watched a Fantail, supported on swiftly-beating wings, gathering cobweb from the wall. A sudden dart forward, a quick twist

of the head, and grey strands of web lay across the black feathers. When this manœuvre had been repeated two or three times, the bird would fly swiftly to its nesting site. It was, of course, impossible for me to reach it as quickly as the builder. One had either to wait by the wall, to watch the gathering of material, or at the tree to see it placed in position. Obviously, there was only one way for this to be done; the head was wiped up and down or across the branch until all the grey felt was safely transferred to the growing home. Later, of course, strands of hair, etc., were used.

Always the nest was moulded by the birds, as they sat in the nest, turning and pressing to shape it with their own curved breasts. The finishing of cobweb was spread over the nest in the same way as the foundations were laid. I was never able to watch the actual beginning, nor be sure when the last touch was given; but building seemed to occupy about a week. The eggs, as a rule, were not laid on consecutive days; and although three formed the usual clutch, sometimes only two, sometimes as many as four, were laid. Incubation occupies exactly 14 days; and, if undisturbed, the young remain in the nest for about the same length of time, then leave home, and do not return.—J.G.

WORKS ON THE FORAMINIFERA.

Mr. F. Chapman, in his "Notes on the Foraminifera" in the August number of the *Naturalist*, recommended certain works to the beginner, but a notable omission from these is his own book, "The Foraminifera: An Introduction to the Study of the Protozoa." This book is obtainable in Melbourne, and some knowledge of its contents will be found essential when the works of Brady, Cushman and other specialists are being studied. To the more advanced student, the article by J. J. Lister, F.R.S., on "Foraminifera," in Lankester's "Treatise on Zoology" (Second Fascicle, Part I, Introduction and Protozoa), is recommended. Dr. Brady's "Challenger Report" is now unpurchasable, but may be consulted in our Public Library. The monographs of Dr. J. A. Cushman are the most easily obtained of works on the foraminifera. Some of these may be purchased from the Government Printing Office, and others from the Carnegie Institution, both of Washington, U.S.A. They must surely rank among the lowest-priced scientific papers issued, but on account of the demand for them by those interested in oil geology, copies of his later works only are now held in stock.—W. J. PARR.

“THE SCIENTIFIC NAME OF OUR CLUB’S BADGE.”

Under this title appeared in this Journal (Vol. XLI, p. 220) for April, a review by Mr. F. Chapman of the nomination of the shell utilised as badge by the Club. Ten years ago, I indicated the fact that the popular name in vogue was technically invalid, and, knowing of no substitute, I proposed what I regarded as a suitable equivalent. This name is now championed, somewhat late in the day, as science keeps moving, whether we move or not. Recently, when working through some Western Australian material, I recognised the Victorian shell, and, referring to Menke’s *Molluscorum Nova Hollandiæ Specimen*, published in 1843, I found that on p. 21 he included *Buccinum fasciatum*, Lam., and, giving a description, added the information: “*Buccinum pyrrhum*, n. olim. in lit.” This means that before Menke recognised that the shells belonged to Lamarek’s species, he had given them the name noted above, and had sent specimens out with that name attached. Under the Laws, as soon as Lamarek’s name was invalid, Menke’s name became valid, and therefore the correct scientific name of the Club’s badge becomes

NASSARIUS PYRRHUS (Menke).

I have very carefully compared Western Australian shells with Victorian specimens, and they are undoubtedly con-specific.

TOM IREDALE.*

*By permission of the Trustees of the Australian Museum, Sydney.

NOTES FROM THE NATIONAL MUSEUM.

A FOSSIL CORAL.

The discovery of a new locality in Victoria for the interesting reef-forming “star-coral,” *Orbicella tasmaniensis*, has lately been made by our member, the Rev. Geo. Cox. The locality is at Flinders, on the Cape Schanck Peninsula, where a small exposure of foraminiferal and polyzoal limestone occurs, resting on the older basalt. A good description of this important fossil bed was given by another club member.

Mr. A. E. Kitson, C.M.G., in 1902 (Report on the Bryozoan Limestone at Flinders. Rec. Geol. Surv., Vic., vol. I, pt. 1, pp. 49-51, and text-fig.). There is probably a danger of this fossil deposit being seriously damaged, if not entirely obliterated, by some projected "improvements" to the Golf Links.

The chief interest of the Flinders Limestone is that it contains an abundance of the curious group of the limy sponges known as the Lithonines, which are still living in Japanese seas; although until Dr. Hinde described specimens sent to him by Dr. T. S. Hall they were not recognised as fossils. As regards the previously-known localities for the above-named coral, they are rather widely separated, and since it is a shallow-water organism, it helps to supply data in relation to the former trend of the coast-line, in Miocene times.

The original locality from which Dr. P. M. Duncan obtained his type specimen is Table Cape, North-West Tasmania. Since then I have recorded it from the fossiliferous ironstone beds of Flemington, whilst Dr. T. Griffith Taylor and Messrs. F. A. Cudmore and J. A. Kershaw have collected it from the ferruginous limestones of Ooldea, on the East-West Railway, South Australia. Quite recently Miss I. Crespin has also recorded its occurrence in the Janjukian ironstone of Green Gully, Keilor. Mr. Cox's specimen is exceptionally well preserved, and he has presented it to the Museum collection.

F. CHAPMAN.

PHOTOGRAPHS FOR THE NATURALIST.

It is proposed, while funds permit, to include one plate at least in each issue of the *Naturalist*. Members are invited to submit prints for consideration by the Editor and the Publishing Committee. Unusual subjects are desired, not photographs of scenery, etc. Writers of papers might submit photographs suitable for illustrations.—Editor.

All contributions for the *Naturalist*, and letters to the Editor, should be addressed:

CHARLES BARRETT,

"Maralena," Maysbury Avenue,

Elsternwick, Vic.

CENSUS OF VICTORIAN PLANTS.

Supplement No. 3.

The following additions and alterations have been made to the Census of Victorian Plants by the Plant Records Committee of the Field Naturalists' Club of Victoria:—

"Nat. Herb" indicates that dried specimens have been found in the National Herbarium; "B" refers to those determined by Prince Bonaparte.

Page 1.—*Alsophila Cooperi*, F.v.M. .. Cooper Tree Fern .. S. Otway, Nat. Herb. (B)

A. *Rebecca*, F.v.M. Wig Tree Fern .. E. Bemm R., Nat. Herb. (B)

Dryopteris queenslandica, Do.- Northern Shield S. Moe, Nat. Herb. min. Fern (B)

D. *tropica* Domin. Tropical Shield Fern E. Genoa, Nat. Herb. (B)

D. *glabella*, C. Chr. Smooth Shield Fern E. Genoa, Nat. Herb. (B)

Page 2.—*Asplenium adiantoides*, C. Chr. Pointed Spleenwort N.W. Nat. Herb. (B)

Polystichum aristatum, Presl. Awned Shield Fern N.E. Alp. Nat. Herb. (B)

Blechnum serrulatum, Rich- Serrate Gristle Fern S. Toolebewong, P. ards St. John.

B. *laevigatum*, Cav. Leather Fern .. . S. Dandenong Ra. Nat. Herb.

Page 3.—*Adiantum capillus-veneris*, L. British Maidenhair S. Evelyn, P. St. Fern John (B)

Page 5.—*Cyclophorus rupestris*, C. Chr. Rock Polypody .. E. Genoa, Nat. Herb. (B)

Gleichenia flabellata R. Br. Fan Fern .. . S.E. Nat. Herb. (B)

G. *laevigata*, (Willd.), Hk. .. Spreading Fan Fern All but N.W.

Page 16.—After *Bartlingia* add—

Borya *nitida*, Labill. . . . Shining Borya . . . S.W. Hall's Gap, C. D'Alton.

Page 18.—*Prasophyllum Colemanae*, Lilac Leek-orchid S. Bayswater, Mrs. Rogers Coleman.

P. *gracile*, Rogers S. Ringwood, C. French, Jnr.

Page 19.—*Microtis oblonga*, Rogers .. S.W., S., N.E., E. E. Pescott.

Page 20.—*Pterostyllis decurva*, Rogers .. S. Ferntree Gully, E. E. Pescott.

P. *truncata*, Fitz. Brittle Greenhood S. You Yangs, W. H. Nicholls.

Revision of the Genus *Bassia*, (Anderson, Proc. Linn. Soc. N.S.W. Vol. XLVIII, Pt. 3.)

Page 26.—For *Bassia diacantha* read B. *uniflora* (R. Br.) F.v.M.

Delete B. *lanicuspis*, B. *biflora*, B. *divaricata*, B. *echinopsila*, and B. *enchylaenoides*.

- Add *B. patenticuspis*, Anderson Spreading Saltbush N.W. Nat. Herb.
son
- B. tricuspis*, (F.v.M.) Three-spined Salt- N.W. Nat. Herb.
son bush
- B. parviflora*, Anderson Small flowered Salt- N.W. Nat. Herb.
bush
- Kochia brachyptera* is now *Bassia brachyptera*, (F.v.M.), Anderson.
- Page 33.—*Acacia falciformis*, D.C. Sickie Wattle . . . S.W. Nat. Herb.
Revision of the Genus *Pultenaea*, (Williamson, Proc. Roy. Soc., Vic.
Vol. XXXVII, Pt. 1.)
- Pultenaea pubescens*, H.B.W. .Downy Bush Pea . S.W. Portland, Nat.
Herb.
- Page 38.—*Pelargonium inodorum*, Willd. Scentless Storksbill All, Nat. Herb.
Formerly included in *P. australe*, Willd.
Revision of the Family *Loranthaceae*, (Blakely, Proc. Linn. Soc.,
N.S.W. Vol. XLVII, Pt. 2.)
- Delete *Loranthus celastroides*, and substitute:—
- Page 24.—*Phrygilanthus celastroides*, Coast Mistletoe . S.W., S., N.W.
Eichl.
- P. eucalyptifolius*, Engl. Common Mistletoe, All.
Loranthus Miquelii, Lehm. Long-leaf Mistletoe S.E. Nat. Herb.
L. Preissii, Miq. Wire-leaf Mistletoe All.
For *L. longiflorus*, Desv. read *L. vitellinus*, Sieb. E. Genoa, Rev. A. J.
Maher.
- Page 33.—*Acacia argyrophylla*, Hook . Silver Mulga . . . N.W. Nat. Herb.
A. brachybotrya Grey Mulga . . . N.W.
- Page 46.—*Eucalyptus agglomerata*, Grey Stringybark . S., P. St. John.
Maiden
- E. Dalrympleana*, Maiden Mountain White N.E., P. R. Sims.
Gum
- Page 48.—*Eucalyptus phellandra*, R. T. Mountain Pepper- S. P. St. John.
Baker mint
- E. upialata*, R.T.B. Island Blue Gum . S. Phillip I., Dr.
Heber Green.

NEW LOCALITIES.

The following are the additions to the regional distribution and are listed under the districts S.W.; N.W.; S.; N.E.; E., with the names of the field workers who have made the record possible. * The figures refer to the pages in the Census.

- S.W.—(18) *Prasophyllum Archeri*, Hk. f.; *P. brachystachyum*, Lindl; *P. fimbriatum*, R. Br.; *P. odoratum*, Rogers. (19) *Calochilus campestris*, R. Br.; *Microtis parviflora*, R. Br.; *Caleana minor*, R. Br.; *Caladenia filamentosa*, R. Br.; *C. leptochila*, Fitz; *C. reticulata*, Fitz; *C. angustata*, Fitz. (20) *Pterostylis concinna*, R. Br.; *P. parviflora*, R. Br.; (22) *Casuarina Luehmanni*, R. T. Baker. (23) *Grevillea rosmarinifolia*, A. Cunn; *G. repens*, F.v.M.; *Persoonia rigida*, R. Br. (24) *Banksia ornata*, F.v.M. (32) *Acacia armata*, R. Br. (33) *A. penninervis*, Sieb. (36) *Dillwynnia hispida*, Lindl. (39) *Eriostemon difformis*, A. Cunn. (44) *Hibbertia humifusa*, F.v.M. (45) *Pimelea axiflora*, F.v.M. (49) *Callistemon rugulosus*, D.C.; *Melaleuca neglecta*, Ewart and Wood.—Gramplains, Chas. D'Alton.
- (46) *Eucalyptus Blaxlandii*, Maiden and Cambage.—Gramplains, J. W. Audas.
- N.W.—(20) *Diuris punctata*, Smith; Wail, Miss I. Francis.
- S.—(13) *Carex polyantha*, F.v.M.—Lerderderg, H. B. Williamson.
- (20) *Caladenia reticulata*, Fitz.—Belgrave, E. E. Pescott.
- (35) *Pultenaea*, D'Altonii, H.B.W.—Brisbane Ranges, Dr. Sutton.
- (47) *Eucalyptus nitens*, Maiden.—Donna Buang, P. R. St. John.
- (68) *Hellipterum pygmaeum*, Bth.—You Yangs, A. C. Gates.

- N.E.—(19) *Thelymitra pauciflora*, R. Br. (20) *Caladenia cordiformis*, Rogers; *Olearia Gunniana*, Hk. f.—Beechworth, Miss J. Galbraith.
 (20) *Caladenia angustata*, Fitz., Nat. Herb.
 (46) *Eucalyptus Bridgesiana*, R.T.B. (48) *E. Smithii*, R.T.B.; *E. camphora*, R.T.B., P. R. Sims.
 (62) *Olearia flavescens*, Hutch.—Alps, A. J. Tadgell.
- E.—(6) *Damasonium minor*, (R. Br.), Buch. (11) *Cyperus exaltatus*, Retz; C. Gunnii, Hk. f. (13) *Carex polyantha*, F.v.M. (15) *Juncus pallidus*, R. Br. (19) *Corysanthes umbriata*, R. Br. (31) *Drosera Planchonii*, Hk. f. (Menziesii). (33) *Acacia Mitchellii*, Bth. (53) *Brachyoloma daphnoides*, Bth. (57) *Ajuga australis*, R. Br. (62) *Selliera radicans*, Cav. (66) *Calocephalus lacteus*, Less.—Bairnsdale, T. S. Hart.
 (20) *Caladenia latifolia*, R. Br.; C. *cardiochila*, Tate; (49) *Hibbertia densiflora*; (55) *Sebaea albidiflora*, F.v.M. (61) *Pratia platycalyx*, Bth. (65) *Brachycome stricta*, D.C.—Sperm Whale Head, F. Barton, Jr.
 (19) *Microtis parviflora*, R. Br. (20) *Caladenia Menziesii*, R. Br.; C. *testacea*, R. Br.; C. *angustata*, Fitz; *Diuris palachila*, Rogers; *Pterostylis nana*, R. Br. (32) *Acacia armata*, R. Br.; A. *pycnantha*, Bth.—Tyers, Miss J. Galbraith.
 (65) *Bidens tripartita*, L.; Snowy R. only in Census.—Newry, D. J. Maher.
 (49) *Kunzea corifolia*, Reichb.—Wilson's Promontory, Dr. Sutton.

CORRECTIONS.

The following corrections should be made:—

Supplement No. 2.—Delete *Prasophyllum album*, Rogers.

Page 34.—*Callistachys elliptica*, Vent., C. *alpestris*, Ktze., C. *procumbens*. (F.v.M.) Engl., C. *triloba*, (F.v.M.) Engl., for *Oxylobium* spp.

.. 31.—*Drosera Planchonii*, Hk. f. for D. *Menziesii*, R.Br.

.. 34.—*Acacia Victoriae*, Bth. for A. *sentis*, F.v.M.

.. 36.—*Dillwynnia uncinata*, (Turcz.) J. M. Black, for D. *patula*, F.v.M.

.. 36.—*Eutaxia microphylla*, (R.Br.) J.M.B. for E. *empetrifolia*, Schlech.

.. 37.—*Templetonia stenophylla*, F.v.M. for T. *Muelleri*, Bth.

.. 38.—Transpose *Geranium pilosum*, Forst and G. *dissectum*, L.

.. 39.—*Phebalium squameum*, (Labill.) Engler for P. *Billardieri*.

.. 41.—*Gymnosporia* for *Celastrus*.

.. 40.—*Correa rubra*, (Smith) J. M. Black for C. *speciosa*, Andr. Red. *Correa*. Add C. *rubra*, var *virens*. Common *Correa* (Green).

.. 41.—*Stackhousia monogyna*, Labill. for S. *linarifolia*, A. Cunn.

.. 45.—*Callistemon citrinus*, (D.C.) Stapf. for C. *lanceolatus*, D.C.

.. 50.—*Thryptomene calycina*, (F.v.M.) Stapf. for T. *Mitchelliana*, F.v.M.

.. 75.—*Bartschia* for *Bartsia*.

Bellardia Trixago for *Bartsia Trixago*.

Sinapis arvensis for *Brassica Sinapistrum*.

.. 77.—*Festuca myuros* for F. *myurus*.

.. 78.—*Glaucium flavum*, Crantz, for G. *luteum*, Scop.

.. 79.—*Melilotus indicus*, (L.) Allion, for M. *parviflora*.

Melilotus albus for M. *alba*.

.. 82.—*Coronopus procumbens*, Gillib. for *Senebiera coronopus*, Poir.

C. *didyma*, (L.) Smith for S. *didymus*, Pers.

Medicago arabica, (L.) Willd. for M. *maculata*.

Medicago hispida includes M. *denticulata*. Delete latter.

.. 75.—*Silybum Marianus*, (L.) Gaertn. for *Carduus Marianus*, L.

Cirsium arvense, (L.) Scop. for *Carduus arvensis*, L.

Cirsium lanceolatus for *Carduus lanceolatus*, Scop.

.. 83.—*Lochnera rosea*, (L.) Reichb. for *Vinca rosea*, L.

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EXCURSIONS.

SATURDAY, SEPTEMBER 12.—Diamond Creek. Object: Orchids.

Leader: Mr. E. E. Pescott, F.L.S. Meet at Prince's Bridge Station in time for 1.20 p.m. train.

SATURDAY, SEPTEMBER 19.—Heidelberg. Object: Pond Life.

Leader: Mr. J. Stickland. Meet at Prince's Bridge Station in time for 1.20 p.m. train.

SATURDAY, SEPTEMBER 26.—Ringwood. Object: Insects.

Leader: Mr. C. Oke. Meet opposite Mutual Store in time for 1.30 p.m. train.

SATURDAY, OCTOBER 3.—Brisbane Ranges. Object: Botany.

Leader: Dr. Sutton. Meet at Spencer Street Station for 7.40 a.m. train. Names to be handed in at September meeting.

SATURDAY, OCTOBER 10.—Bendigo. Object: General. Leader:

Mr. C. Daley. Meet at Spencer Street Station at 6 a.m. Members desiring to stay for week-end must hand in their names at the September meeting.

Christmas Excursion to Wilson's Promontory.—Names to be handed in as soon as possible, in order that accommodation may be secured.

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The Victorian Naturalist :

THE JOURNAL AND MAGAZINE

— OF —

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The Author of each article is responsible for the facts and opinions recorded.

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1925.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 12th OCTOBER, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER.	SECONDER.
Mrs. J. V. Henry, 48 Ormond Road, Elwood.	Mr. G. Coghill.	Mr. C. Oke.
Miss A. F. Barrett.	Mr. C. Barrett.	Mr. F. E. Wilson.
Mr. Herbert Dickens, Denham Place, Malvern.	Mr. V. Miller.	Mr. E. E. Pescott.
Mr. E. G. M. Gibson, "Tavistock," 18 Venus St., Caulfield.	Mr. E. E. Pescott.	Mr. C. French.
Mr. Fred. Whitterton, "Cooranga," Linthgow Road, Toorak.	Mr. F. Chapman.	Mr. C. Oke.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

By Mr. A. E. Rodda, "Two Weeks at Bethanga."

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

VOL. XLII—No. 6

OCTOBER 9, 1925

No. 502

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, September 14, 1925. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

CORRESPONDENCE AND REPORTS.

A letter from the Secretary of the Garden-week Committee, inviting the Club to take charge of the Wild-flower Section at the Garden-week Exhibition, was received and referred to Committee.

Reports were given as follows:—

Mr. C. Daley, excursion to You Yangs on August 15; Mr. Stickland, excursion to Kilby Lagoon on August 29; Mr. A. E. Rodda, excursion to Studley Park on September 5; and Mr. E. E. Pescott, excursion to Diamond Creek on September 12.

GENERAL.

It was resolved, on the motion of Messrs. Daley and H. B. Williamson, that the thanks of the Club be sent to the Minister for Lands, the Hon. A. W. Downward, for his action in securing the reservation of Mt. Drummer.

Mr. A. J. Tadgell moved that the thanks of the Club be tendered to the Plant Records Committee for their work in compiling the additions to the "Census." Mr. F. Pitcher seconded the motion, which was carried unanimously.

Mr. C. Barrett said that he had heard that it was proposed to form a parking area for motor cars at the entrance to Belgrave Gully, and, if this were so, he thought that the Club should protest against any encroachment on the area reserved.

Mr. C. Oke moved that the matter be referred to the Committee, Mr. Pitcher to make enquiries at Belgrave as to

what was proposed, and report to the Hon. Secretary. Seconded by Mr. Williamson, and carried.

ELECTION.

On a ballot being taken, Mrs. F. Chapman, Threadneedle Street, Balwyn; Miss Jean Harvie, Chanak Street, East Malvern; and Miss C. Piper, Black Street, Brighton, were duly declared elected as ordinary members of the Club.

PAPERS.

1. "The Royal Botanic Gardens, Kew, England," by Mr. A. E. Keep. The author gave a history of the Gardens, and described features of special interest. He also referred to different species of Australian plants growing at Kew.

2. "Victorian Ants" (Part II), by Mr. J. Clark. Owing to the lateness of the hour when this paper was called it was taken as read.

EXHIBITS.

By Mr. G. Coghill—*Grevillea rosmarinifolia*, *G. oleoides*, *G. alpina*, *Thryptomene Mitchelliana*, *Micromyrtus microphylla*, *Eriostemon myoporoides*, *Acacia myrtifolia*, *A. acinacea*, and *Hardenbergia monophylla*; all grown at Canterbury.

By Mr. J. R. Leslie—Mosses from Wilson's Promontory, in illustration of article in September *Naturalist*.

By Mr. V. H. Miller—*Cyrtostylis reniformis* and *Corysanthes pruinosa*, from Black Rock.

By Mr. F. Pitcher—Author's presentation copy to Mrs. Flora Martin, of Cooke's *Handbook of Australian Fungi*, with a letter to Mrs. Martin from the New South Wales Government, intimating its contribution of £105 towards cost of publication of the work.

By Miss J. W. Raff—Living Land Planarian, *Bipalium*, from Queensland, and two well-developed young, produced by fission last June; also fresh fragment, just beginning to form a head. Collected by Mr. D. F. Thomson near Brisbane, May, 1925.

By Mr. A. E. Rodda—Shells, Organ-pipe Coral and Flat Sea Urchin, from Cairns, Queensland; also Miocene Fossil Sea Urchin, for comparison with Queensland specimen;

THE ANTS OF VICTORIA.

BY J. CLARK, F.L.S.

[PART II.]

(Communicated by C. Barrett)

*Read before the Field Naturalists' Club of Victoria,
September 12, 1925.*

Sub-family PONERINÆ, Lepeletier.

The ants of this sub-family are large or of moderate size, and the workers and females are armed with a formidable sting. The petiole is composed of only one joint, or node. In some genera the post-petiole, or first segment of the abdomen, is greatly constricted behind, as in *Myrmecia*, making this section appear to be two-jointed. In other genera, as *Amblyopone*, the node is attached to the post-petiole throughout its entire posterior surface, with the result that these ants do not show a distinct node when seen in profile.

The Ponerinae are the most ancient group of ants, and are the stock from which the higher, specialised sub-families arose. Nowhere are they a dominant group, except in Australia, where, according to Prof. W. M. Wheeler, "these ancient insects occupy a position amongst ants analogous to that of the monotremes and marsupials among animals, and the Rhynchocephalia among reptiles. And it is especially the genus *Myrmecia*, comprising the 'Bull-dog Ants,' which may be said to characterise this fauna, and, at the same time, to represent the prototype of all ants."

All the species form small colonies, usually in the ground, under logs and stones. Some, however may be found nesting in rotten logs, and in tree-stumps. The life-history and habits of most of our species are unknown, but they may be regarded as being insectivorous. Many species, of several genera, may be found hunting on trees and shrubs in flower, where they obtain numbers of small insects. Frequently they are seen sipping the nectar of the blossoms. This applies particularly to *Myrmecia*, *Rhytidoponera*, and *Chalcoponera*. No species has been observed attending aphids, scale-insects, or mealy-

bugs on the trees; but at least one species, *Euponera lula*, generally has a large number of mealy-bugs in its nest.

The nests of Ponerinae are much frequented by other insects. Colonies of *Chalcoponera* and *Euponera* are rarely without visitors, insects of some of the other orders. Other Arthropods, such as mites, pill-bugs, etc., are also commonly found in most nests.

The sketch reproduced here illustrates the principal portions of an ant. The terms (and the positions indicated) are

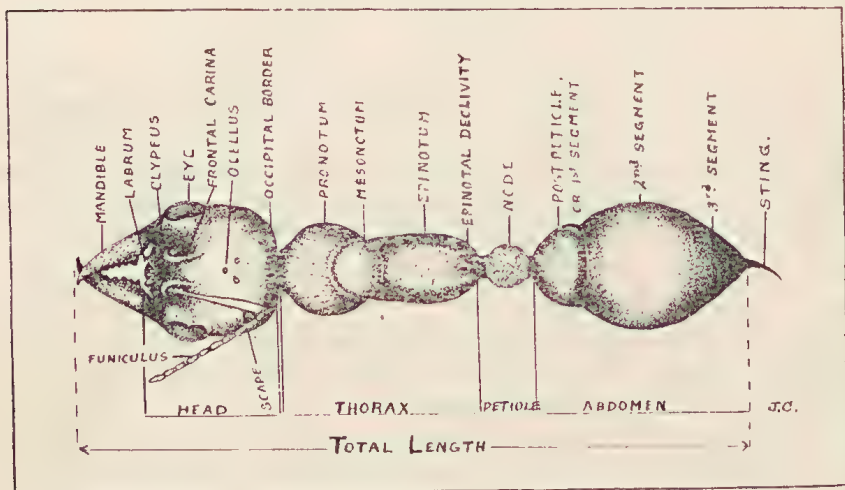


Fig. 1.—*Myrmecia* (*Promyrmecia*) *aberrans*, Forel.
Dorsal view of the worker to show the principal parts.

those generally used in literature, and will be adopted in these articles.

Tribe AMBLYOPONII.

This tribe is represented in Australia by two genera, namely, *Amblyopone* and *Myopopone*; only the first, however, has so far been found in Victoria.

Genus, *Amblyopone*, Erichson.

Erichson, Arch. fur. Naturg., vol. III, p. 260, pl. 5, fig. 7, 1841.

Emery, Genera Insectorum, Fasc. 118, 1911.

In this genus the petiole consists of one joint; this is articulated over the whole of its posterior surface with the

first segment of the abdomen. The mandibles are long and narrow, with few teeth on the inner border. Eyes very small. Antennæ 12-jointed.

These are primitive ants, living in small colonies in the ground. They may sometimes be found under logs and stones. I have several times found nests in rotten logs in S.W. Australia. These logs always contained colonies of Termites, and the larvæ of Lamellicorn beetles, upon both of which, no doubt, the *Amblyopone* depend for food.

Ants of this genus do not expose themselves during the day, nor have I seen them on the surface of the ground. They shun the light. They travel long distances under half-buried logs and stones, and have tunnels diverging in all directions. The actual nest is rarely seen in such situations, being generally deep underground. I have found the queens and the brood only in rotten logs. Frequently several fertile females may be present in one colony. The winged males and females are observed in the nests, running with the workers, during January and February.

At present little or nothing is known concerning these ants. The fact that, generally, they are found in comparatively moist, or damp, situations, where beetle and other larvæ abound, suggests that they prey on these; probably also on Termites.

5. *AMBLYOPONE AUSTRALIS*, Erich. Ferntree Gully (F. P. Spry, J. E. Dixon, L. B. Thorn, C. Barrett); Beaconsfield (F. E. Wilson).

Erichson, Arch. fur. Naturg., 8, p. 260, pl. 5, fig. 7, 1841, ♀; Smith, Cat. Hymn. Brit. Mus., 6, p. 109, pl. 7, figs. 21-24, 1858, ♀ ♀ ♂.

Amblyopopone australis, Er., Froggatt, Agric. Gaz., N.S.W., 1905.

Amblyopone australis, Er. Ern. Andre, Rev. d'Ent., 15, p. 260, 1906, ♀ ♀. Emery, Gen. Insect., Fasc., 118, 1911.

Originally described from Tasmania, this species is found throughout Southern Australia. It is about one-third of an inch in length, and varies in colour from light ferruginous to dark brown. The head is coarsely, but not densely, punctate, except in front. The thorax is smooth and shining, and has a few scattered punctures. The mandibles are long and nar-

row, with 5-6 teeth on the inner border. The eyes are very small, and there are no ocelli. The antennæ are short, the scapes not reaching beyond the eyes.

The female is larger than the worker, and is winged. She has larger eyes, and three well-developed ocelli.

The male is black, with the antennæ, tibia, and tarsi yellowish. The mandibles are small and triangular. The antennæ are 13-jointed. The thorax is densely punctate; the node almost smooth. The worker and the female are provided with a large and powerful sting.

6. *AMBLYOPONE AUSTRALIS*, Er., var. *OBSCURA*, Smith. Ferntree Gully (F. P. Spry); Belgrave (F. E. Wilson).

Amblyopone obscura, Smith, Cat. Hymn., Brit. Mus., 6, p. 109, 1858 ♀♀.

Amblyopopone australis, Er., var. *OBSCURA*, Sm. Froggatt, Agric. Gaz., N.S.W., 1905; Forel, Rev. Suisse Zool., 18, p. 2, 1910, ♀♀; Emery, Gen. Insect., Fasc., 118, 1911.

This variety has a wide distribution in Eastern Australia, ranging from Tasmania to North Queensland. It is much like *australis*, but is larger and darker in colour. The head is more densely punctate behind, and more definitely striate in front. The epinotal declivity, in both the worker and the female, is inclined to be transversely rugose; in *australis* it is smooth and shining.

The male differs from the male of *australis* much more than the workers of the two species differ. It is much larger and more strongly sculptured. The thorax and node are densely punctate. The antennæ and legs are darker in colour.

7. *AMBLYOPONE FERRUGINEA*, Smith. Ferntree Gully (F. P. Spry); Belgrave (F. E. Wilson); Woori Yallock (L. B. Thorn).

Smith, Cat. Hymn., Brit. Mus., 6, p. 110, 1858, ♀.

Froggatt, Agric. Gaz., N.S.W., 1905.

Ern. Andre, Rev. d'Ent., 15, p. 261, 1906, ♀♀; Emery, Gen. Insect., Fasc., 118, 1911.

A small species, barely a quarter of an inch in length. It is yellowish, or reddish yellow. The head and pronotum are

finely, and longitudinally, striate. The remainder of the body is smooth and shining.

The female is slightly larger than the worker, and is winged. The head, thorax and node are brownish black; the mandibles, antennæ, legs and abdomen reddish, or yellowish red. The male is unknown.

This species appears to live in small colonies, under stones. At present nothing is known concerning its life history, nor habits.

Tribe MYRMECHINI, Emery.

This tribe contains only one genus, and is purely Australian.

Genus *Myrmecia*, Fabr.

Fabr., Syst. Piez., p. 423, 1804.

This is a large genus, and, with the exception of one from New Caledonia, all the species are found only in Australia and Tasmania. They rank among the largest of known ants; some examples measuring up to 1½ inches. They are very conspicuous, and most of the species are very aggressive. They will generally follow an intruder for some distance, if the nest is disturbed. The genus is well represented throughout Australia, but is more abundant, in species and individuals, in the coastal areas than in the dry interior. Some species, however, range far inland, and a few appear to be confined to the interior. Some of the species are widely distributed, while others are very local. When searching for food, in the trees or on the ground, these ants are fearless, attacking every living thing they meet. Even man himself they do not fear. They seem to have a strong objection to picnic parties, and, perhaps, have disorganised more picnics than all the other animals of the bush together.

This genus has been divided into four sub-genera, based mainly on the size and formation of the mandibles and the antennæ. This division, however, is not very satisfactory. Emery, in the *Genera Insectorum* (1911), erected two sub-genera, *Promyrmecia* and *Pristomyrmecia*, to contain some species which were certainly out of place in the genus *Myrmecia*, s.str. Both of these sub-genera contain only jumping species; but, apparently, Emery did not know that half the species of the whole genus are jumpers. The *Myrmecia*,

s.str., do not jump; they are walkers, or runners. Wheeler*, in dealing with "jumping ants," noted that the jumpers had not been separated, so he erected another new sub-genus, *Halnamyrmea*, to contain these, with *M. pilosula* as the type. Something had to be done to correct the distribution made by Emery; but it is doubtful whether the new sub-genus tends to improve matters. Both the sub-genera erected by Emery are composed of jumpers, and the anatomical details are not sufficient to warrant such separation, as, under these conditions, it almost becomes necessary to erect a sub-genus for every other species.

The variations in the formation of the mandibles and the length of the scapes is very great among the jumpers. In many cases it is almost impossible to say definitely in which of the sub-genera some of the more obscure forms should be placed. To avoid further confusion, I maintain only two divisions of the genus, and separate them into *Gressoria*, *Myrmecia*, Fabr. s.str., and *Saltatoria*, *Promyrmea*, Emery.

The *Gressoria* contains *M. Gulosa*, *vindex*, *forficata*, and their allies, all of which are species with long legs adapted for walking only. The *Saltatoria* contains *M. (P) aberrans*, *pilosula*, *mandibularis*, and their allies, all of which have short legs, and the posterior pair adapted for jumping. They have the femora of the hind legs slightly thickened, and are able to leap some inches along the ground. The formation of the mandibles is variable in this section, but the antennal scapes rarely pass the occipital border in the workers.

The *Gressoria* are the largest of the Bull-dog Ants, and generally construct their nests in the ground. When the nest is underground they raise a more or less cone-shaped mound on the surface with material excavated. The entrance usually is at the summit, and is an irregular opening, from one to four inches in diameter. Occasionally nests are found under logs or stones, and, in some localities, even in rotten logs. The colonies are small, rarely numbering more than 200 individuals. Sometimes the number is greater, but more often about 100 individuals comprise the colony.

The ground-nest usually goes down two feet, almost vertically. There is a series of three or four pockets on the ground level, just under the mound. Similar pockets occur

*Wheeler, Observations on *Gigantiops destructor*, Fabricius and other Leaping Ants; *Biological Bulletin*, Vol. XLII, No. 4, 1922.

at intervals down the shaft, which terminates in a large chamber. During the summer months the brood, more particularly the pupæ, generally is in the surface pockets. At the first alarm the brood is carried to the bottom chamber.

The winged males and females are found in the nests during the summer. Usually the nuptial flights take place, during the afternoon, in the period from February to April. After the flight the male dies, but the female, using her legs, breaks off her wings. She constructs a cell under a log or a stone, in which she deposits her eggs. Sometimes three or four females, with their eggs, are discovered in one cell, under a stone. When the eggs hatch these females fight with each other until but one remains alive to found the new colony. There is only one queen in a nest. In many instances ergatoid females have been found in the nests with queens. These females differ from the workers only in having the thoracic sclerites more developed; sometimes wing-pads are present, but no wings.

These ants hunt in bright sunlight, rarely, if ever, coming out at night. The food consists mainly of the nectar and exudations of trees and plants. The larvæ, however, are insectivorous, and are supplied with insects and caterpillars as food.

8. MYRMECIA GULOSA, Fabr.

Formica gulosa, Fabr., Syst. Ent., p. 395, ♀, 1775.

Myrmecia gulosa, Fabr., Smith, Cat. Hymn., Brit.

Mus., 6, p. 143, 1858; Lowne, Entomologist, 2, p. 1865; Mayr., Jour. Mus. Godef., XII, p. 95, 1876; Froggatt, Agric. Gaz., N.S.W., pp. 5 and 9, pl. 1, fig. 3, 1905; Emery, Gen. Insectorum, Fasc., 118, p. 21, 1911.

This species was selected by Emery as the type of the genus. It does not appear to be common in Victoria, although plentiful in all the other Eastern States. The workers measure from $\frac{3}{4}$ to fully 1 inch in length. The head and most of the body are reddish-yellow; the three apical segments of the abdomen are black. The first segment of the abdomen is yellowish, like the body. The jaws are yellow and the teeth brownish.

9. MYRMECIA NIGRISCAPA, Roger. Cheltenham (C. Barrett); Belgrave (F. P. Spry); L. B. Thorn; Greytown (J. E. Dixon); Portland (H. W. Davey).

Roger, Beryl. Ent. Zeitschr., p. 33, 1861, ♀; Mayr, Verh. Zool. Bot. Ges. Wien., XII, p. 723, 1862, ♀; Froggatt, Agric. Gaz., N.S.W., p. 1905, ♀; Emery, Gen. Insect. Fasc., 118, p. 9, 1911, ♀.

This species is very close to the preceding one. The colour is a little darker, more reddish. The antennal scapes are blackish brown. The apical segments of the abdomen are reddish; in *gulosus* they are black. The workers measure from 17 mm. to 26 mm.

The female closely resembles the worker, but is larger (26 mm. to 29 mm.). The colour is darker, and the sculpture stronger. The head is broader behind, nearly square. The antennal scapes do not extend so far beyond the occipital border as they do in the worker. The node is more strongly rugose. The wings are hyaline.

The male (length 15 mm. to 18 mm.) is differently coloured from the worker. The head is reddish, with the occipital border and the sides blackish. The pronotum and scutellum are blackish, tinged with red. The remainder of the thorax, node, first segment of the abdomen, legs and antennæ are yellowish red. The mandibles are yellow; the wings hyaline.

This ant has a wide range, extending from Bunbury, Western Australia, round the Southern Coast to Rockhampton, Queensland. It constructs the usual dome-shaped mound-nest, but occasionally nests under logs and stones. The dealated* females may be found, during May to July, in cells under stones, with their eggs. The eggs are small, slightly under 2 mm. in length and 1 mm. in width; they are yellowish-white. From five to seven eggs are laid at a time. The eggs hatch in from six to nine days, but six to seven months elapse before the first ants appear. These are always small examples, owing no doubt to the scarcity of food. The first brood are raised entirely by the female. While rearing this small family the queen devotes much time to excavating a nest. By the time the first ants appear she generally has a small nest, about 6 inches underground, where the larvæ and pupæ are stored. On the arrival of the small family the female stops all work and devotes her energy entirely to egg-laying.

*Females which have dropped their wings.

The new workers at once enlarge the nest, and attend to all future eggs, larvæ and pupæ. The second, and subsequent, broods usually are normal size, as the workers procure the food. Sometimes a few small workers may be found, particularly in spring. These are regarded by some naturalists as minor workers, but I consider that they are merely the result of a scarcity of food during the winter months.

10. *MYRMECIA VINDEK*, Smith. Sea Lake (J. C. Goudie); Mallee (J. E. Dixon).

Smith, Cat. Hymn. Brit. Mus., 6, p. 147, 1858, ♀; Mayr, Verh. Zool. Bot. Ges. Wien., XII, p. 72, 1862, ♀; Froggatt, Agric. Gaz., N.S.W., p. 10, 1905; Emery, Gen. Insect., 118, p. 11, 1911; Crawley, Ent. Mon. Mag., 3, III, p. 119, 1922.

This species was originally described from Western Australia. It is, however, widespread through Southern Australia.

The worker (length 16 mm. to 25 mm.) is rather slender. The colour is reddish-yellow, with the whole of the abdomen shining black. The mandible and clypeus are a clear yellow, with the teeth brown.

The female is larger (23 mm. to 27 mm.), but closely resembles the worker. The wings are long.

The male (15 mm. to 18 mm.) is coloured very much like the worker, but has the first segment of the abdomen also reddish-yellow. In this sex the mandibles are small and triangular, with only three teeth. The antennæ are 13-jointed, and almost as long as the body; the scape is very short.

The life and habits of this species are similar to those of the preceding, but the workers are more pugnacious. They drop off trees and plants on to the passer-by more readily than do more other species.

11. *MYRMECIA VINDEK*, Smith. var. *DESERTORUM*, Wheeler. Maldon (J. C. Goudie); Mallee (J. E. Dixon).

Wheeler, Proc. Roy. Soc., S. Aust., XXXIX, p. 805, 1915, ♀.

This variety was described from specimens collected at Todmorden, South Australia. It is widely distributed in the inland portions of West Australia, South Australia, Vic-

toria, and New South Wales. It varies much in size and slightly in colour. It is of a much lighter yellow than *vindex*; the head and abdomen are dark brown, sometimes almost black. It is also more densely covered with fine hairs than *vindex*; while the striation of the thorax and node usually is not so strong.

The female resembles the worker very closely, but is slightly larger.

The male is very much like the male of *vindex*, but the first abdominal segment is black, not reddish, as in *vindex*.

In Central Western Australia this species generally nests in the roots of trees. My friend, Mr. J. Hickmer, of Jigalong, states that the natives call it "Toon-jee," and treat it with great respect.

12. *MYRMECIA VINDEX*, Smith, var. *NIGRICEPS*, Mayr. Cheltenham (C. Barrett); Ferntree Gully (F. P. Spry); Portland (H. W. Davey).

Myrmecia nigriceps, Mayr. Verh. Zool. Bot. Ges. Wien., XII, p. 725-728, 1862, ♂; Froggatt, Agric. Gaz., N.S.W., p. 9, 1905.

Myrmecia vindex, Sm., var. *nigriceps*, Mayr. Forel, Fauna Sud-west, Aust. 1, 7, pp. 264-266, 1907; Emery, Gen. Insect., 118, p. 11, 1911; Viehmeyer, Arch. fur, Naturg., 79, p. 28, 1913, ♂.

This variety is distributed throughout Australia. It is slightly larger and darker than *vindex* or *desertorum*, and the sculpture is stronger than in both of these; the head is broader behind. In all other respects it is much like *vindex*.

Viehmeyer described, with doubts, a single male from South Australia as the male of this species. According to his description, the specimen most certainly does not belong to this species. The male of *nigriceps* is almost identical with the male of *vindex*, differing only in its slightly darker colour.

I have, growing in my garden at Sandringham, a Myrtle-leaf Acacia, *A. myrtifolia*, 2½ inches in height, and bearing 12 flowers. This, I consider, is almost a floral record for acacias. In June last I brought from the Dandenongs this seedling, which is thriving in its new environment.—A.J.T.

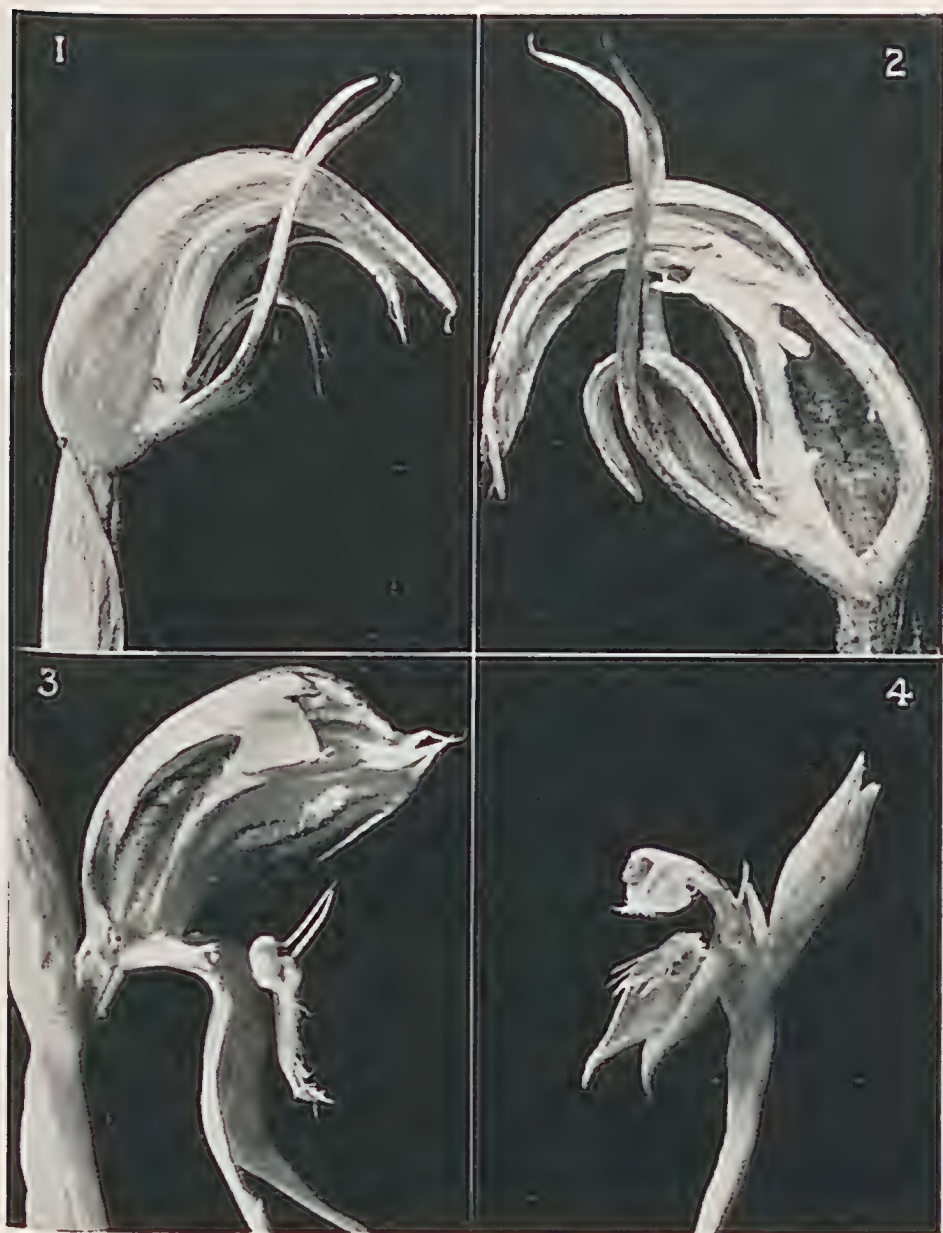


Fig. 1 *PTEROSTYLIS ACUMINATA*
(Magnified about 2 diam.)

Fig. 2 *PTEROSTYLIS ACUMINATA*
One Side Cut Away
(Magnified nearly 3 diam.)

Fig. 3 *PTEROSTYLIS RUFO*
One Side Cut Away
(Magnified about 3 diam.)

Fig. 4 *PTEROSTYLIS PUSILLA*
(Galea Cut Away)
(Magnified about 3 diam.)

THE FLOWER SHOW.

In spite of the dryness of the past winter and a consequent late season, this year's Flower Show was considered by many to have been the best yet held.

On account of the recent destruction by fire of the Town Hall in Melbourne, that of St. Kilda was chosen for the display of the beauty of our bush, and, in spite of its distance from the chief civic centre, the Show was successful, the attendance being greater than the Committee had dared to expect.

Flowers came from widely-distant places, and Queensland was the only State unrepresented. From Western Australia was sent a fine collection of curious and beautiful species, the most notable being the lovely purple *Platytheca galeoides*, kin to our own lovely *Tetrathecas*, two Kangaroo Paws, *Anigozanthus Manglesii* and *A. humilis*, *Lambertia multiflora* *Simsia latifolia*, the Blue Tinsel Lily, *Calectasia cyanea*, *Isopogon rosea*, *Hibbertia stellaris*, *Petrophila linearis*, and many others.

New South Wales supplied its incomparable Waratah, *Telopea speciosissima*, the most regal of all our flowers, the lovely Flannel-flower, *Actinotus Helianthi*, the charming, but badly-named, Native Rose, *Boronia serrulata*, and the fine Lance-leaved *Crowea saligna*.

From Broken Hill were the Sweet Quandong, *Fusanus acuminatus*, with grey foliage and attractive bright-red fruits, the glorious Sturt's Desert Pea, *Chianthus Dampieri*, the rare *Cryptandra propinqua*, fine blooms of *Eremophila alternifolia*, the Silver Cassia, *C. artemisioides*, our only blue *Boronia*, *B. cærulescens*, two really handsome saltbushes, *Kochia tomentosa* and *Bassia eriacantha*, and several noticeable composites, of which *Helipterum polygalifolia*, the Milk-wort Sunray, and three Asters, *Olearia magniflora*, *O. rudis* and *O. pimelioides*, were particularly good.

Of flowers from our own State, about 200 species were staged systematically. The acacias were, perhaps, better

represented than usual by two dozen species, the great majority of them familiar to most of us. The most novel were *A. spinescens*, which describes itself and is obviously from the dry North-West, *A. microcarpa*, the Manna Acacia, *A. colletioides*, Wait-a-while, also armed with defensive spines, the very beautiful *A. buxifolia*, with grey box-like leaves, and the almost equally attractive *A. brachybotrya*, the Silver Mulga, all from the same district. Two others not so uncommon were the Woolly *A. lanigera* and the Narrow-leaf Acacia, *A. linearis*, from Foster. Gippsland furnished more flowers than have come to us in former years from that quarter, and a particularly good lot, of seventy species, from Pakenham was effectively staged. Among these was a fine bunch of *Epacris microphylla*, the Coral Heath. Other Heaths from the east in good form were the Common, the Woolly and the Blunt-leaved.

Taradale, in the north, yielded the ever-welcome Fairy Wax-flower, *Eriostemon obovalis* and Tetratheca, two pretty epacrids, *Leucopogon juniperinus*, the Prickly Beard-heath, not often shown, and *L. ericoides*, the Pink Beard-heath, as well as our best *Grevillea alpina*.

Swainsona procumbens came from further afield.

A good supply of material was sent from the Mallee, Ouyen being responsible for as many as five boxes. Of the many species only a few can be detailed, such as *Pittosporum phillyræoides*, the weeping member of its genus, a handsome specimen of which, by the way, can be seen in the Melbourne General Cemetery, two Prostantheras, *P. chlorantha*, the curious Green and *P. aspalathoides*, the Scarlet Mint-bush, the Silvery *Phebalium bullatum*, the Pink Velvet-bush, *Lasio-petalum Behrii*, the very blue Lavender Halgania, Eutaxia, the Desert *Cassia eremophila*, the Three-winged Blue-bush, *Kochia triptera*, and several composites, amongst which were the Soft Billy Buttons, *Craspedia pleiocephala*, and the Olearies *pimeleoides*, *rudis*, *ciliata* and *Muelleri*.

Ordinarily we depend greatly on the Grampians for our success, and again there was the customary showing of its floral magnificence. *Thryptomene* (*Mitchelliana*) *calycina*, *Micromyrtus* (*Thryptomene*) *ciliatus*, the Fringed Heath-myrtle, Lhotzkya, and Pink Swamp-heath, with the Olive Grevillea, the Boronias, *B. pinnata* and *B. pilosa*, the Slender Conosperm, and many others, the arrangement of which was greatly admired. It is gratifying to find the first-named plant,

the Bushy Heath-myrtle, becoming so popular. Soon no garden will be without a plant, as it is so easily grown. At the Frankston golf links it is sown broadcast, and in one case a thick scrub of it is coming along in most robust fashion.

Undoubtedly the most popular section of our flora is that of the orchids. Quite a number of people are devoting themselves to their study, and they are being photographed quite exhaustively. This year's display was, as ever, the centre of attraction.

Unfortunately the late rains and the early date of the show prevented the exhibition of as many species as on former occasions, but the very best use was made of the scanty supply of blooms. The most interesting were two from Western Australia, *Drakea elastica* and *Caleana nigrita*. The best of our own came from Rushworth, Wonga Park and Nyora, and, generally speaking, all were very well packed for transport. Nine *Pterostylis*, mainly *curta*, *nutans*, *alpina*, *longifolia* and *pedunculata*, dominated the tables, and their green was mainly relieved by the Wax-lip, *Glossodia major*, and the Snake Orchid, *Diuris pedunculata*. Only twenty-six species in all were represented, and some of them, like the two *Lyperanthus*, *Cyrtostylis*, the Tall Leek-orchid, *Prasophyllum elatum*, the Fringed Helmet-orchid, *Corysanthes fimbriata*, the May-fly Orchid, *Acianthus caudatus*, the Brownbeards, *Calochilus Robertsoni*, and the Common Bird-orchid, *Chiloglottis Gunnii*, could muster only from one to very few blooms. There were very few specimens, too, of the six *Caladenias* present.

The selection of cultivated plants from our own Botanic Gardens took, as before, pride of place at the head of the hall. Many fine flowers were shown, the most noticeable of which were the New South Wales Waratah, *Bauera sessiliflora*, *Grevillea Hookeri*, and *G. Caleyi*, *Chorizema cordatum*, *Brachysema lanceolata* and *Chamaelaucium*, the Geraldton Wax-flower, the last three from Western Australia, *Eriostemon myoporoides*, *Acacia montana*, *A. myrtifolia*, *Pomaderris lanigera* and several *Pultenæas*.

Apparently there were few novelties amongst the Victorian plants sent in; only the above-mentioned *Acacia spinescens* and *Kochia triptera* were noted.

Is there not just a little danger that in time our show may become somewhat monotonous and lose the interest of

some of the public in consequence? Quite a number of our best flowers have never yet been put before city folk. We do not remember to have seen, so far, our own *Telopea*, the *Sassafras*, *Howittia*, *Prostanthera spinosa*, *Pholidia gibbosa*, *Humea elegans*, *Eucryphica*, the fine variety *aspera*, and *Hovea longifolia*, from Yarra Junction, nor even *Diplanthena Moræa*, which is common at Lower Fern-tree Gully, on our tables. We will have to make a point of securing one or more new things at each show, and draw particular attention to these. Perhaps on some future occasion we might even hold the show in January, and let the people see what beauties the mountains afford.

With *Helichrysum rosmarinifolium* and *H. Stirlingii*, *Grevillea Victoriae*, *Bæckeia crenatifolia*, and *B. Gunniana*, *Boronia alida*, *Bossiaea foliosa*, *Oxylobiums*, *Prostantheras*, *Celmisia*, the upland form of *Leptospermum lanigerum*, *Veronica nivea*, *Epacrids*, *Gentiana*, *Richea* and *Gaultheria* as a basis, what a fine display we could stage, and this idea seems worth serious consideration.

The following is a list of contributors of flowers, with the localities whence they were gathered:—

NEW SOUTH WALES,

Mr. C. G. Brown, Sydney; Mr. A. Morris, Broken Hill.

SOUTH AUSTRALIA.

Master Colin Jenkins, Keith; Mr. E. H. Ising and Mr. Hann, Adelaide.

WESTERN AUSTRALIA.

Miss L. Hanson and Rev. Ernest Bryant, Bunbury; Mr. Higgins, Perth.

TASMANIA.

Mrs. Walker, Mt. Magnet.

VICTORIA.

Mallee.—Mr. F. Holt, Ouyen.

Northern.—State School; Bush Nursing Centre; Gately children, Dingee; Mr. H. Dorman, Miss Dorothy Dorman, Miss Jean Diss, Mrs. C. Hansford, Miss Amy Hansford, Taradale; Mrs. Rich, Rushworth; Mrs. Brooks, Maldon; Mr. Reeves, Bendigo; Boys of State School, Elphinstone.

North-Eastern.—Miss Warr, Wangaratta; Miss Jeffrey, Molesworth; Mrs. Evans, Lima East; Mrs. J. W. Boucher, Chiltern.

Gippsland.—Mrs. W. F. Dyall, Drouin; Mr. F. Barton, Foster; Miss J. Galbraith, Tyers; Miss Fox, Glengarry; Mr. F. Wilkinson, Drouin; Mr. T. Williams, Drouin; Miss Ros-siter, Hedley; Mr. R. Penny, Briagolong; Mr. T. Hart, Bairnsdale; Mr. Campbell, Glenaladale; Miss L. Dyall, Gar-field; Mr. F. Wisewould, Pakenham.

Southern.—State School, Torquay; Mr. P. Davon, French Island.

South-West.—Mr. C. D'Alton, Grampians; Miss Heal, Stawell; Miss F. Allsop, Dreeite.

Melbourne District.—Mr. and Mrs. V. Miller, Beacons-field; Mr. G. Higgins, Red Hill; Mr. J. Young, Montrose; Rev. G. Cox, Mornington; Mr. E. F. Hayes, Moranding; Mr. W. Operman, Croydon; Mr. W. Tonge, Eltham; Miss E. Kennedy, Frankston; Mrs. Allan Yeo, Pheasant Creek, Kinglake; State School, Wonga Park (Mr. L. Dyer), Master R. Foubister, Panton Hill; Miss Nokes, Sandringham; Mrs. Hill, Sandringham; Mrs. E. Coleman, Blackburn; Mr. F. Pitcher, Belgrave; Mr. E. Pescott, Mr. G. Coghill, Mr. J. W. Audas, Mr. St. John, Miss Roberts, of Nyora; Mesdames Daley and Hughes, Frankston; the late Director, W. Laid-law, of Melbourne Botanic Gardens.

The Committee is indebted, as in former years, to the proprietary of the "Age" for the paper required to cover the tables; to that of the "Argus" for the fine notices which contributed so largely to its success in the way of the attendance; and to the Messrs. Keep Brothers for their kind loan of motor lorry and driver for the carriage of the parcels of flowers, etc.

Notes on the Dryopidæ (Parnidæ).

The genus *Dryops* of Olivier (1791), being one year prior to *Parnus* of Fabricius, gives its name to an interesting family of beetles. They are found in fresh water, attached to submerged sticks or the underside of stones, for which their unusually long and strong claws are especially adapted, but are unable to swim and are very slow in their movements.

They have little anatomical affinity with true Water-beetles (Dytiscidæ, Hydrophilidæ or Gyrinidæ), being more closely related to the Dascillidæ. Their larvæ are said to live in damp earth, under stones, and to resemble the larvæ of certain Elateridæ. Their affinity with the Dascillidæ is also in accord with the habits of certain species of this family.

Mr. A. M. Lea has lately described *Sclerocyphon aquaticus* (Dascillidæ), of which he and I found three examples on logs that were submerged in water at Waratah, Tasmania, in company with *Helmis tasmanicus*. These beetles want close looking for, as they are small and often remain still or move very slowly, besides being half-covered by a film of slime. This is probably the reason that they have so eluded our naturalists, though probably many species occur in our rivers and creeks. In 1864 the Rev. R. L. King described nine species belonging to three genera, in the Transactions of the Entomological Society of New South Wales (the precursor of the Linnean Society of N.S.W.). Since then only three species have been added, one each by Grouvelle, Blackburn and Lea. I have some five or six new species, either in the press or in MSS., and should be very glad to receive further specimens for examination from collectors, as well as any observations on the reproduction of any members of the genus. All that I have examined with a Zeiss binocular belong to the genus *Helmis* (formerly *Elmis*), which seems to contain the greater number of our species.

These beetles are able to breathe by carrying with them a film of air attached to the villose clothing of their abdomen; but little, if anything, is known of the life-history of the Australian species. The family is thus classified in Fowler's *Fauna of British India*:—

I. Abdomen with five visible ventral segments.

- i. Anterior coxæ transverse, with distinct trochantus.

Sub-fam.: Dryopinæ.

- ii. Anterior coxæ globular, without trochantus.

Sub-fam.: Helminæ.

II. Abdomen with six or seven visible ventral segments.

Sub-fam.: Psepheninæ.

The last is so far unrecorded from Australia; their larvæ are abundant in the rapids of Niagara.

H. J. CARTER.



In the Proceedings of the Linnean Society of N.S.W., Vol. L, 1925, pp. 299-310, the Rev. H. M. R. Rupp comments interestingly on his collection of thirty-two *Pterostyles*, giving ten good figures in the text, amongst which are those of *Pt. furcata* and *falcata*, *decurva* and *squamata*, *rufa*, *Mitchelli* and *vittata*. In the same journal Dr. E. C. Chisholm gives a fine account of the flora of the Comboyne Plateau, with map, and a list of the plants growing there.

Another *Callistemon*, or another name which will probably have to be added to the list of Victorian plants, is *C. pallidus*, Sm., which Mr. Edwin Cheel would dissociate from *C. salignus*, Sm. Though it resembles the latter in general appearance, its branches are less drooping, its young leaves are clothed in silvery, not rufous, hairs, and at maturity are pallid green, or somewhat glaucous, terminate in a sharp *mucro*, and are thicker in texture, with less prominent venation. Forms of this species have been obtained at elevations above 2000 feet in N.S.W. and Victoria, and the Buffalo Range (F. v. Mueller, 1856) and Granite Hill, Wilson's Promontory (J. W. Audas, 1908) are given as localities in this State.

A new species, *C. Chisholmi*, from North Queensland, is also described by Mr. Cheel in this number, which has much interest to botanists. This has blood-red filaments and anthers. and grows into a small tree.

In speaking of *C. subulatus*, a comparatively recent addition to our flora, found by Mr. H. B. Williamson at Tonghi Creek, Mr. Cheel describes it as somewhat like our alpine *C. Sieberi*, the leaves being narrow and sharp. The filaments and anthers are richly crimson, and, in his opinion, it really has closer affinity to *C. lanceolatus*, from which, however, it differs in its crowded fruits and its smaller, thicker, grey leaves. It is found in many places in New South Wales.

Mr. Cheel describes a new species of *Boronia* in the *Journal and Proceedings of the Royal Society of New South Wales* for 1924. This, *B. saffrolifera*, is from the coastal district of N.S.W., north of Sydney, and superficially resembles *B. floribunda* and *B. pinnata*.

He also discusses the latter, and some of the many forms which Mueller included in what was, to him, a very polymorphic species. Mr. Cheel regards all of these as well-marked species, and even goes further in declaring, after examining specimens collected by the Baron on the Bunyip Creek, and by Mr. P. R. H. St. John at Labertouche—the variety *Muelleri* of Benth—that they are distinct from the *B. pinnata*, Sm., common in the Port Jackson district. Beyond pointing out that the oil of *B. Muelleri* has a pleasant fragrance, whereas that of *B. pinnata* is unpleasantly acrid, he does not describe the differences between the two plants.

As the result of his researches in the genus *Melaleuca*, Mr. Cheel recognises *M. erubescens*, Otto (N.S.W.), *M. Gunniana*, Schauer (Tas., Bass Strait and Vic.) and *M. ternifolia*, F. v. M. (N.S.W.), all formerly included in *M. ericifolia*, Sm., as distinct species.

From material derived from Lord Howe Island, and so far regarded as *M. ericifolia*, he creates *M. Howean*, and a plant of N.S.W., with larger yellow flowers, not concave leaves, akin to *M. squamea*, he describes as *M. capitata*. He also distinguishes a new variety, *glabra*, of *M. squamea*. In addition he raises the variety *alternifolia*, Maiden and Belche, of *M. linarifolia*, ranging from N.S.W. to Queensland, to specific rank.

The item in his paper which is of more particular interest to us is *M. Gunniana*, specimens of which, in the Sydney Herbarium, from the Upper Yarra, Port Phillip, Mordialloc, Metunga and Narrewarren, are, in Mr. Cheel's opinion, distinct from *M. ericifolia*, Sm., with which they have been previously confused.

A matter worth mentioning also in this *Journal* is the description by de Beuzeville and Welch of a new *Eucalyptus* from the main divide at an elevation of 4000 feet, near Cooma, in N.S.W. This *E. Badjensis* is a large forest tree of 100 feet or more, known locally as "Gully Ash." It resembles *E. viminalis*, with which it is associated, but differs mainly in its smaller, conical, sessile fruits, which are, however,

arranged in the cruciform fashion so characteristic of that species, and its narrower and duller green leaves.

The finding of *Pultenaea graveolens*, Tate, at Steiglitz, on the occasion of the Club excursion to the Brisbane Ranges on October 3, clears up the doubt that existed as to the exact habitat of the plant in this State.

In 1885 specimens were sent to the National Herbarium by Mr. S. Johnson, of Meredith. These were found by Mr. H. B. Williamson, when engaged in the revision of the genus, in the parcel containing *P. mollis*, where they had been placed by the late Baron von Mueller. Several plants were noted on a rocky, sterile hillside near the almost-deserted township of Steiglitz, in the low, open forest of red iron-bark, yellow gum, red stringybark, messmate, and red box. There was very little undergrowth, the ground being almost devoid of vegetation over quite large areas. The *Pultenaea* is an unattractive, unkempt-looking bush about three or four feet high, with downy stems and foliage of small, narrow, incurved leaves, and was still in bud. When crushed, the leaves yield an aroma which is certainly not unpleasant—and so it belies its name—but is difficult to describe, though Mr. I. M. Black finds in it a resemblance to cream cheese.

From the nature of the country around Meredith, it is certain Mr. Johnson did not collect the plant near that place, but most probably from where it was found by us.

THE "RUFÆ GROUP" OF GREENHOODS.

The group of Greenhoods, known as the "rufæ group" of *Pterostylis*, which does not include the Banded Greenhood, *P. vittata*, has given rise to much confusion among collectors, as, superficially, the species are much alike. All are reddish or greenish-reddish in colour. One only of the group is described by Baron von Mueller, in his key, at page 419; but Dr. R. S. Rodgers' research has credited at least four to Victoria—the Ruddy-hood, the Rusty-hood, the Scaly Greenhood and the Mitchell Greenhood. These are fully described by Dr. Rogers, on page 153 of Mr. J. M. Black's *Flora of South Australia*, 1922, as *P. pusilla*, *P. rufa*, *P. squamata* and *P. Mitchellii*.

The photographs (Plate V) show portions of the flowers cut away so as to display the marked differences between *P. rufa* and *P. pusilla*. *P. rufa* usually is a tall species, the lower part of the flower ending in long thread-like tails. The tongue is thinner than in *P. pusilla*, with longer hairs on the margins and with usually two very long hairs at the base. *P. pusilla* is richly coloured in shadings of brown, green and red. It is usually slender and somewhat dwarf. The tongue (labellum) is flesh-like, with a few front marginal hairs.

In one photograph the Pointed Greenhood, *P. acuminata*, is shown intact; in another, the same flower with one side of the hood removed. This orchid has sometimes been thought to be a hybrid between the Nodding Greenhood and the Blunt Greenhood, *P. nutans* and *P. curta*, and was so collected by the writer of these notes, at Mordialloc, in August, 1910. However, last year Mr. W. H. Nicholls submitted the specimen photographed to Dr. Rogers, who fully established its identity. Mr. Nicholls is well known to members of the Club as a keen worker on Victorian orchids, who has delineated much detail accurately and naturally for, let us hope, a forthcoming book.—A.J.T.



"BEES' WINTER HARVEST."

Mr. J. A. Ross, Nanneella Estate, via Rochester, writes:—
 "Re 'Bees' Winter Harvest,' in September issue. The secretion of nectar by the glands on the phyllodes of the Golden Wattle was mentioned some considerable time ago in a couple of the Apicultural Journals, and is not unknown to bee-keepers. As with all other nectar-producing plants, the amount of secretion seems dependent on climatic conditions. In seasons when conditions have been, and are, suitable, I have noted the bees 'roaring a treat' in Golden Wattles well isolated from any other trees or nectar-producing plants—

working the glands ravenously; and this some time before the first flower on the trees had opened. How the bees find it I know not, but it seems a lure spread for them and other pollinating insects to give a chance of fertilisation to the earliest opening flowers. Once the trees start flowering the secretion from the glands seems to cease. This is a point I have not previously seen noted. Perhaps these glands would have made a good illustration for Darwin."

"WINNING" WILD BIRDS.

During the past three years, while living at Pakenham Upper, I have been impressed by the tameness of bush birds, when not hunted or otherwise molested. In my garden and orchard is a friendly feathered company. In a pine tree, 15 paces from the back door of the house, a pair of Magpies, *Gymnorhina hypoleuca*, are nesting now (September). The birds do not attack us; indeed, do not take any notice when we pass the tree. For several years these magpies, or their progenitors, have frequented the garden, nesting in trees beyond the fences, and bringing their broods about the house for food. This year they and their friends have come "home" to nest.

Butcher-birds, *Cracticus torquatus*, and Magpie-larks, *Grallina cyanoleuca*, come to the tin plate placed at the back door with food for the house dog, and take any scraps that he may leave. The Butcher-bird has developed a liking for fruit luncheons. One has been observed frequently taking mulberries. At times the *Grallinas* drink milk from the cat's saucer, right at the door. Last year, and this season, the Butcher-birds built in an acacia growing by the orchard fence. They are so friendly that they perch on the rose and dahlia stakes, close to her, as soon as my wife appears in the flower garden; and, as she walks around, hoeing or weeding, they follow. They hop near her hands, or on to the hoe, and pick up grubs that are unearthed.

The Kookaburras, *Dacelo gigas*, for several years in succession, have nested close to the house, bringing their young to us as soon as they could fly. We have sometimes seven or eight Kookaburras in the garden at one time. One pair, the grand-parents no doubt, follow us around. If a grub is in sight, and not offered to them, they will fly down, right

beside us, to secure it. Both these old birds will take grubs from our hands. The male is so confiding that, if I hold a grub on the palm of my hand, out of reach from his perch on a bough, he will fly on to my arm and take the morsel.

The confidence of small birds, also, has been won. Grey Fantails, *Rhipidura flabellifera*, at times enter the house through doorway or window, and capture flies. Without the least sign of fear, they will perch on one's head or shoulder. Nor are any of our bird-friends alarmed when we shoot at the parrots eating buds off the almond and other fruit trees. They seem to know that the shots are not meant for them. We have three species of parrots in our territory. It is worthy of note that the beautiful King Parrot, *Aprasmictus scapularis*, has been present in numbers this year.—F. WISEWOULD.

SUBSCRIPTION RATES AND RULES.

Attention is directed to the following list of rates and extracts from the rules relating to subscriptions:—

Ordinary members, with Journal	20/-
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EXCURSIONS.

SATURDAY, OCTOBER 10.—Bendigo. Object: General. Leader:
Mr. C. Daley. Meet at Spencer Street Station at 6 a.m.

SATURDAY, OCTOBER 17.—Ringwood. Object: Orchids.
Leader: Mrs. E. Coleman. Meet opposite Mutual Store in
time for 1.30 p.m. train.

SATURDAY, OCTOBER 24.—Spring Vale. Object: Botany.
Leader: Mr. Williamson. Meet opposite Mutual Store in time
for 1.15 p.m. train.

SATURDAY, OCTOBER 31.—Greendale. Object: General.
Leader: Dr. Shuter. Meet at Spencer Street Station in time
for 7.40 a.m. train. Tickets to Bacchus Marsh, thence by
car (about twelve miles). Leader will provide lunch.
Names to be handed in at next meeting.

CUP DAY, NOVEMBER 3.—Belgrave. Object: General. Leader:
Mr. G. Coghill. Meet opposite Mutual Store in time for 8.50
a.m. train.

SATURDAY, NOVEMBER 7.—Labertouche.

SATURDAY, NOVEMBER 14.—Eltham. Object: Birds. Leader:
Mr. W. Tonge. Meet Princes Bridge Station in time for
1.20 p.m. train.

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THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 6th November, 1925

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 9th NOVEMBER, 1925.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—
Miss Melbourne,
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SECONDER.
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Miss R. Currie

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Mr. S. S. Strutt,
"Hanslett,"
Tongala.

Miss E. C. Cameron

Miss R. Currie

Mrs. S. S. Strutt,
"Hanslett,"
Tongala.

Miss E. C. Cameron

Miss R. Currie

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

By Mr. Lance Le Souef—"Central Australia," illustrated by lantern slides.

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, October 12, 1925. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

REPORTS.

Heidelberg, Sept. 19.—Mr. J. Stickland reported that a small party of members spent a pleasant afternoon around the ponds, but nothing of note was collected.

Ringwood, Sept. 26.—Ten members attended this excursion. Several good "finds" were made, the most interesting, perhaps, being a colony of Termites. When a large piece of bark on an old stump was stripped off, the Termites were revealed, running up and down in files; very few failed to keep in the narrow tracks. Another stump contained a nest of the Wood-ant, *Iridomyrmex nitidus*, the ants with the peculiar sweet odour of which cats seem so fond. Everyone agreed that the odour was of a decidedly sweet nature, but not one that cats would be expected to like.—C. OKE.

Brisbane Ranges, Oct. 3.

Bendigo, Oct. 10.

(Reports appear elsewhere in this issue.)

GENERAL.

Sale of Native Flowers.—Mr. E. E. Pescott said that, as requested by the Committee, he had made enquiries regarding the granting of permits for gathering flowers in the Grampians. A member of the Forestry Commission had told him that no damage was being done, as the area in regard to which permits had been granted was far from the Wild-flower Garden, and seldom, if ever, visited by tourists. The Tourist Bureau and the Railway Department had each sent an officer to inspect the area, and they had reported that no damage was being done.

Destruction of Fairy Wax-flower at Bendigo.—After some discussion as to what steps could be taken to protect the Wax-flower at Bendigo, on the motion of Mr. A. E. Keep, seconded by Mr. F. G. A. Barnard, it was resolved that the Hon. Secretary should write to the Mayor of Bendigo calling attention to the destruction of the plants, and asking whether anything could be done to protect them and prevent the sale of blossom on Picnic Day.

PAPER.

“Two Weeks at Bethanga,” by Mr. A. E. Rodda. The author gave some account of the country around Bethanga, and the fauna met with during a recent visit.

EXHIBITS.

By Mr. Geo. Coghill: Plants grown at Canterbury, *Leptospermum laevigatum*, *Micromyrtus ciliatus*, *Grevillea rosmarinifolia*, *Tecoma australis* and *Daviesia latifolia*.

By Mr. F. Chapman, A.L.S.: Original drawings of fossil Foraminifera, from the tertiary (Balcombian) beds of Port Phillip; to illustrate a paper shortly to be published by F. Chapman and W. J. Parr.

By Miss C. C. Currie: Two eggs of the Gippsland Giant Earthworm.

By Mr. J. E. Dixon: 72 species of Coleoptera collected in the Lake Hattah district, N.W. Victoria, during September.

By Mr. L. Hodgson: Seven species of native flowers from the Whipstick Scrub, at Bendigo, *Eriostemon obovalis*, *Bæckeia diffusa*, *Bæckeia ramosissima*, *Calytrix tetragona*, *Daviesia ulicina*, *Olearia asterotricha* and *Grevillea alpina*.

By Mr. J. A. Kershaw: *Octopus bosei* ♂, collected at Port Melbourne, 29/5/5.

By Miss F. Smith: *Sarcophilus falcatus*, from Cann River district, Victoria.

By Dr. C. S. Sutton: *Pultenaea graveolens*, *Prostanthera decussata*, *Grevillea floribunda*, *Pomaderris ferruginea*, etc., from Brisbane Ranges; also *Ruppia maritima*, from Little River.

By Mr. H. B. Williamson, F.L.S.: *Acacia doratoxylon*, *Pultenaea styphelioides*, *Helipterum incanum*, *Dillwynia ericifolia*, and a dried specimen of the Narrow-billed Bronze Cuckoo, from Chiltern, N.E. Victoria.

EXCURSION TO THE BRISBANE RANGES.

For the excursion to the Brisbane Ranges on October 3 and 4 two members took train to Lara, where they were joined by the Rev. Mr. Gates, who very kindly motored them to Anakie. Before leaving Lara, however, a short visit was paid to the railway line towards Little River. Here the reserve was unusually gay with flowers, amongst them many Composites and Pimeleas, *Velleya paradoxa*, and in particular *Prasophyllum Odoratum* and *Thelymitra aristata*. Time did not permit going further on to where the Black Brittle-rush, *Chorizandra enodis*, had been discovered by Mr. Gates—the only locality so far known for this plant in the southern district.

Arrived at Anakie, the car was left at the foot of the range, and after going along the Anakie-Durdidwarrah road for a short distance the first track to Steiglitz was followed. From this point to a little short of Steiglitz the substratum is composed of sand and gravel, and the same plant association continues throughout, with occasional slight variation.

The tree growth is composed mainly of Red Stringybark, Messmate, Yellow Gum and Long-leaf Box, and, not infrequently, Red Box, Red Ironbark and Common Peppermint, with an occasional Black Sheoke. *Xanthorrhœa australis* and *Hibbertia stricta* stood out beyond all other plants of smaller size, both in frequency and continuance, and the Golden Wattle was also persistent and abundant. Except the Hedge Acacia only one other made much of a show, and this, *A. pycnantha*, though just past its best, was still a glorious sight. There are half-a-dozen Grevilleas in the Ranges, and the finest of these, *G. floribunda*, the golden, was never quite out of the picture. *G. rosmarinifolia* and *G. aquifolium*, the prickly, were also seen, the latter not yet in flower.

Five epacrids were noted, but they were not conspicuous. The Common Heath was here *not* very common, but Mr. Gates, who returned from Steiglitz the same day by the more northern track, noted an abundance of it on the way, show-

ing particularly fine colour, from the palest to the deepest pink. The Peach Heath was very good, as was also the Common Beard-heath. *Monotoca scoparia* and *Acerotriche serrulata* were, of course, not in flower. The only myrtaceous plants seen, apart from the gums, were *Leptospermum scoparium* and *L. myrsinoides*, which would be more conspicuous at a later date.

Two isolated patches of *Eriostemon obovalis*, neither very extensive, were encountered, but the plants are neither so robust nor so floriferous as those in the Bendigo district. Of the leguminous species, only *Pultenaea daphnoides* and *Dillwynia ericifolia* were in full bloom. *D. floribunda* was only commencing to show the beautiful colour which distinguishes it in this locality; *Gompholobium*, *Daviesia corymbosa* and *Pultenaea humilis*, all abundant in the Ranges, were still in bud. It is interesting to record that the Hop Bitter-pea is quite rare hereabouts.

Of the orchids only *Glossodia major* and *Caladenia cœrulea* were numerous. *Pterostylis nutans* and *P. nana* were discovered in one spot only, growing in company. Occasional Pink Fingers and a few Leopard Orchids completed their list. The Liliaceæ were not much in evidence. *Bartlingia sessiliflora* was a notable find for the locality. *Dianella revoluta* was yet to flower. Only the appealing and ever-charming Early Nancy fully represented the family.

About Steiglitz the Ordovician comes to the surface, and there is much bare ground between the gums. Here the Yellow Box appeared for the first time. Red Ironbarks were more frequent, and along Sutherland's Creek Manna and Swamp Gums were present. Here, too, by the kindness of Mr. Cooper, a local resident, who is well acquainted with all the plants and their virtues, we were introduced to what was the most important plant noted during the outing—*Pultenaea graveoleus*. Unfortunately it was still in bud, but Mr. Cooper promised to send flowering specimens and seedlings to town, so that eventually this rare species may perhaps be seen flourishing in the Botanic Gardens.

Though there is a delicensed hotel in Steiglitz it does not afford accommodation to visitors, but lodging was found in a deserted house, where, with the aid of a good fire, and some chaff bags, a comfortable night was passed. On Monday morning Mr. Cooper, after showing us, amongst other interesting things, a fine specimen of *Olearia pannosa* growing in his

garden, a bush of *Pomaderris ferruginea* in full bloom near the creek, and a valiant pear tree which, though ring-barked most thoroughly, was still flourishing and making an effort to bridge the gap in its stem with new bark, was good enough to pilot us across country to the Meredith road.

From here on to the Moorabool the vegetation did not invite excursions from the road. There was very little undergrowth, and nothing that had not previously been noted was seen. *Acacia tenuifolia* here took pride of place in its genus, though *A. pycnantha* still occurred, and some fine mats of it, covered with golden blossoms, were particularly admirable. Cushions of the Green Ground-berry were also more frequent, and small stoneworts, minute pennyworts, porantheras and millotias scantily covered the sterile ground, and were only distinguishable on close scrutiny. After a time the Grass Trees reappeared, and with them a slight increase in the number of species, but this did not last long, and the descent to the river was only broken by a pause to collect again *Pomaderris ferruginea* by the roadside.

At the Moorabool the Black Wattle, Woolly Tea-tree, Swamp Bottle-brush and Burgan, *Kunzea peduncularis*, had not yet responded to the, as yet, frigid advances of Spring, and the billy was boiled and a frugal lunch eaten without floral distractions.

Beyond the river the vegetation continued to be uninteresting, and a wide detour on each side of the road, just before the termination of the forest, resulted in the discovery of nothing more notable than a recurrence of the *Kunzea*.

Thereafter the only matter leading to a diversion from the highway was the appearance of a wide expanse of flat, wet ground, covered with a low, close growth, of a reddish colour, which on examination was taken to be *Plantago coronopus*, practically unmixed with any other species and stunted by the sourness of the soil.—C.S.S.

The Butterfly Flag, *Diplarrhena Moraea*, is not found nearer to town than about Lower Fern-tree Gully. At Upper Pakenham it is quite common, and, previous to our latest Show, at the date of which it was not yet in bloom, it has figured for the last six years in Mr. Wisewould's exhibits from that place.

EXCURSION TO BENDIGO

Six members journeyed to Bendigo on Saturday, October 10, and proceeded to the ranges to the south of the city. Here, in some parts, the bush was gay with the Fairy Wax flower, *Eriostemon obovalis*. Pink-eyes, *Tetradheca ciliata*, were brilliant in purple colouring, and the golden blooms of *Acacia pycnantha*, *A. armata*, *A. diffusa*, and *A. aspera*, made a pleasing contrast. The Native Indigo, *Indigofera australis*, and the Gorse Bitter-pea, *Daviesia ulicina*, were in full bloom, as also were the Daphne Heath, *Brachyloma daphnoides*. The ranges were very dry, and moisture-loving plants were few. The only orchids seen were the Wax-lip, *Glossodia major*, fairly numerous, and solitary specimens of Pink Fingers, *Caladenia carnea*, and Brown-beards, *Calochilus Robertsonii*, the Currant-Bush, *Leptomeria aphylla*, was in fruit. After an enjoyable ramble amid the Wax-flower undergrowth, One-tree Hill was reached, whence a widespread view of plains, undulating country, and ranges was obtained. Then the course was made westward through the Ironbark ranges, amid a profusion of wild-flowers to the Spring Gully Reservoir, thence back to the city.

On Sunday a visit was made to Flagstaff Hill, about seven miles past Eaglehawk, in the Whipstick Scrub. The country here was also very dry, and floral wealth not so evident as on the occasion of a previous visit. The scrub consisted mostly of Green Mallee, *Eucalyptus viridis*, and Melaleucas, the Broom Honey-myrtle, *M. uncinata*, the Cross-leaf, *M. decussata*, and the Crimson, *M. Wilsonii*. Here and there amid the scrub was a fine variety of flowers. Most noticeable were the pretty *Micromyrtus microphylla*; the dainty *Backea ramosissima*; the pungently-scented *Boronia anemonifolia*, just past its bloom; the purple *Prostanthera hirtula*; Grevillias, varying in colour from white to red; *Olearia teretifolia*; the rare *Westringia rigida*; and *Astrotricha ledifolia*. The Wax-flower does not grow robustly in the Whipstick. The Common Fringe Myrtle, *Calythrix tetragona*, was in bud and flower in great quantity. The blue *Dampiera lanceolata* was also in flower, with several Composites, Hibbertias and Goodenias. Nearly sixty plants

in all were observed in flower, but no plants previously unlisted were noted. The Leafless Currant-bush was in fruit, and the troublesome parasite, *Cassytha melantha*, with strangling grip on scrub and tree, was in flower and fruit. Before returning to the city we inspected in operation a plant for the distillation of oil from the leaves and young branches of the Green Mallee, *E. viridis*. A point very noticeable about the old alluvial workings on the mining areas is the widespread growth of the Chinese Scrub, *Cassinia arcuata*, to the exclusion of other growth. The Fairy Wax-flower has a general popularity, the evidence of which is shown by the wholesale manner in which it is gathered for sale at Bendigo and at the railway stations en route, especially at Elphinstone. Continuance of this will eventually tend to its disappearance in some areas.

THE "STICK-FAST" FLEA IN NORTHERN TERRITORY.

The "Stick-fast" Flea, *Echidnophaga gallinacea*, Westwood, known in Western Australia since 1914 and more recently from South Australia*, now appears to have become established in the Northern Territory, where it has been found recently on aborigines' dogs in the vicinity of Cape Don Lighthouse. In a communication, forwarded with specimens, Mr. Hugh W. Christie, until recently head lighthouse-keeper at Cape Don, stated that the pest had appeared only recently. The locality is about 100 miles north-east of Port Darwin, where Mr. Christie has had over 20 years' experience in charge of the Lighthouse at Cape Charles, and is inhabited only by the lighthouse staff and their families and a few aborigines. Whence the fleas came cannot be stated, but whilst it is possible they were introduced from Western Australia, it may be recalled that some of our worst pests have almost certainly obtained their foothold in Australia from direct importations into the Northern Territory from the East. The fact that dogs belonging to nomad aborigines are heavily infested suggests ready means of wide distribution. *Ferguson, Aust. Zool. III, pt. III, 1923.—By G. F. HILL, Entomologist, National Museum, Melbourne.

[For illustration and note of this flea, see *Vic. Nat.*, vol. XL (October, 1923), p. 119.]

A NATURALIST AT BETHANGA.

BY A. E. RODDA

*(Read before the Field Naturalists' Club of Victoria,
September 14, 1925)*

The object of this paper is to record some observations made during a fortnight's visit, in February and March last, to Bethanga—a district that combines much natural beauty with opportunities of observation not generally met with on this side of the Dividing Range.

The journey occupies the total length of the North-Eastern railway line to Wodonga, and then a distance of nine miles along the Cudgewa line, as far as Ebdon. Leaving Wodonga, the line soon passes into hilly country, sparsely timbered, except on the higher ranges further back. The narrow valley of the Kiewa River, with its attendant billabongs (a characteristic feature of the rivers of this country), is crossed on a long bridge. Two small stations, Bandyanna and Bonegilla, are name only, no signs of habitation being visible, and, as names, are relieved from absurdity by their obvious aboriginal origin. They are passed without stopping.

The next station is Ebdon, which has at least four buildings, including the railway station. Here the train is left for a five-mile drive on a gravelly road to Bethanga. The road is of the switchback type—up hill and down dale—with a level stretch of a mile across the valley of the Mitta Mitta and its many billabongs. Beyond is a narrow valley, down which flows the Bethanga Creek, a very small stream, considering the area it drains. Another mile or so of switchback and the valley widens out to disclose the village of Bethanga nestling at the head of it. All around are high, bare hills, topped, in some cases, with large, pinkish boulders of gneissose schist, and pierced by long gullies, each with its trickle of water contributing to the main creek. What timber ever grew on these hills has long since been removed for the requirements of the mines, evidences of which still remain in the form of mouldering poppet legs, tall and

crumbling brick chimney stacks, and great heaps of brown mullock.

These hills, surrounding the village, were, at this season, covered with a thick mat of grass; they form a grazing common for large numbers of cows, on the products of which the inhabitants live, as there is no cultivation, excepting a few small patches of lucerne in the gullies. Practically the only trees remaining on the hillsides in the vicinity of the village are a few Currajongs, *Brachychiton populneus*, which serve as a small reserve of emergency fodder in the dry season. The currajong is considered locally as the indestructable tree. The specimens in question have been lopped to the bare branches time and again, and still put forth a mass of succulent foliage, which is all the denser on account of rigorous pruning. The soil of the valley is very deep and in places where the creek has cut through to bed rock, the section shows over twenty feet of gravelly soil.

Bethanga, sharing the fate of many mining townships, can now be designated as "of the past." At one time it was the scene of much activity, but the auriferous ore is of a refractory nature and could not be treated by battery process; necessitated a large roasting and smelting plant, which remains now in practically the same condition as when in use, save for the ravages of time. Below the works, on the creek bank, are great dumps of purple sand from the pyrites roasters, now tunnelled in all directions by rabbits. Close by are large heaps of iridescent slag from the smelters, many great lumps still retaining the clinical shape of the large cast-iron wheel-ladles. Where the creek skirts the slag-heaps, the copper solutions draining into it have precipitated a beautiful blue-green carbonate, which coats all objects beneath the clear water. So highly mineralised is the water of the creek that it is considered unfit for human consumption, although stock seem to relish it. The paddocks of ore stacked about the works, and sparkling with copper and arsenical pyrite, are destined, perhaps, never to be treated. The pyrite is slowly decomposing in the weather and forming white crusts of arsenious oxide.

The walls of the machinery-houses are dotted with what appear to be bobs of clay, thrown up by mischievous boys, but are really the nests of mud-building wasps, or "hornets," as they are locally called. These nests consist of elongated cells of clay placed side by side, and are packed with comatose or defunct spiders, among which unsavoury surroundings

lives and feeds the yellow larva. The clay cells, when just completed, are beautiful examples of insect architecture, but are soon plastered over with irregular pellets in a mound-shaped mass. Hanging from the rafters are other elegant examples of insect industry, in the form of the honeycomb homes of paper wasps, well guarded by their vicious owners.

On the hillsides, wherever the rocks outcrop, is found the common Rock Fern, *Cheilanthes tenuifolia*, and the Necklace Fern, *Asplenium flabellifolium*. These, with several small patches of Bracken, which does not seem to thrive in this soil, are the only ferns common in the district. In the mouths of several of the old mining tunnels, Fairy Martins, *Petrochelidon ariel*, have nested freely, but the nests have all been destroyed by boys. The birds were flying in and out, and it was found that they had profited by their unfortunate experience, and had nested further back, in almost complete darkness, where the small boys dare not venture. Even thus late in the season, broods were being reared. Among the Martins' nests were several empty nests of the Welcome Swallow, *Chelidon neoxina*.

Other inhabitants of these tunnels were bats and an owl, both of which retreated to the darker depths while the disturbed swallows sought the open air. Possibly foxes also dwell there, as several were heard barking on the hillsides in the evenings. Among the outcropping rocks rabbits have their burrows, and into impregnable cracks in the larger boulders skink lizards of the *Egernia* family insinuate themselves—they can be removed only in pieces.

Following the winding gully-road up past the old mines, a low saddle of the range is reached at a place, of course, called "The Gap." From here a magnificent panorama of the Murray Valley is opened up. The noble river winds about amid a perfect maze of billabongs, through a fertile valley dotted with magnificent red gums, *Eucalyptus rostrata*. To the west can be seen the towns of Albury and Wodonga, and straight across, only four miles away, are the great quarries and earthworks of the Hume Weir. This, when completed, is destined to turn the whole of the valley in sight, and also that of the Mitta, into a vast expanse of wealth-giving water. The twin townships of the workers, one on either bank of the river, present an orderly array of neat frame-houses, fronted by lawns and gardens, and laid out into regular, tree-planted streets. Schools, shops, and recreation halls are provided with cheap electric light, and

an unlimited water supply. Beyond the Murray Valley rise range after range of lightly-timbered hills, on the New South Wales side; and, looking back into Victoria, an even more bewildering array of mountain peaks is seen, culminating in the dim blue heights of the Australian Alps.

A drive up the Murray Valley, via Talgarno, and skirting the river most of the way, was enjoyed. Coming down from the hills, the undulating country becomes thinly-timbered with well-grown trees, mostly a species of box, with its characteristic greyish foliage of round leaves, and a few stringy-barks and peppermints. Near Talgarno a small paddock, close to the road, contained six ostriches. On the river-flats are magnificent red gums, sturdy in bole and wide-spreading in branch. Here is the bird-lover's paradise. Rosellas, *Platycercus eximius*, lorikeets, *Glossopsittacus concinnus*, and the dainty little red-backed parrakeet, *Psephotus haematonotus*, fly screaming from tree to tree; and grass parrots are flushed in pairs from the coarse tussocks. The usual dozen of grey-crowned babblers, *Pomatorhinus superciliosus*, leap excitedly among the branches of a wattle tree, and a company of white-winged choughs, *Corcorax melanorhamphus*, take flight, with mournful, though melodious, flute-like whistles. In flight they show the white wing patches that mainly distinguish them from their sable cousins, the crows and ravens, cawing raucously overhead. On a bare hillside a small flock of rose-breasted galahs, *Cacatua roseicapilla*, comes to rest, and a few white cockatoos, *C. galerita*, are screaming amid the timber higher up. There are many small birds about on the flats. Tree-creepers, *Climacteris*, of two kinds seemingly defy the laws of gravity by making impossible-looking hops up vertical tree-trunks, and red-browed finches, *Aegintha temporalis*, are busy among the Bursaria bushes, where some of their ungainly nests still remain.

In places the foothills come steeply down to the river or its billabongs, and the road passes through them in sidling cuttings. Magnificent lagoons some of these billabongs are: wide, still, and deep, bordered on one side with the pink granitic rocks of the hillside, and on the other with dense beds of reeds and bulrushes. On the placid waters float teal, *Virago gibberifrons*, and black duck, *Anas superciliosa*, but not many, as, although the season is not yet open, the guns have been busy among them for weeks past. Where the water shallows, it is thickly covered with aquatic vege-

tation, among which water-birds of several species prospect busily, taking little notice of passing vehicles. Stop the buggy, however, and descend, and instantly every bird scuttles, with loud splashings, over the lily-pads to the shelter of the reed-beds. Smaller waterholes, that are drying up, are tenanted by herons of four species, and their kindred. Among the birds noted here were the yellow-billed spoonbill, *Platibis flavipes*, white ibis, *Ibis molucca*, and egret, *Garzetta nigripes*.

Looking up the gullies, down which flow feeble streams over coarse granite gravel, one is struck by the lack of undergrowth and other vegetation generally characteristic of mountain creeks. Only grass and thistle-beds clothe their banks. Towards the heads of the gullies the timber becomes thicker, and the bright foliage of the currajongs and wattles relieves the prevailing sombreness of the eucalypts. From an outcrop of rock, a large lace lizard raced across the road to a dead tree. Only one snake was seen, and that a large black one, on the flat; it promptly disappeared down a deep and impregnable hole in the river-bank.

Leaving the main road and crossing the flat, an enormous lagoon, almost a lake, choked with aquatic vegetation, was passed. This was the haunt of half-a-dozen pelicans, *Pelecanus conspicillatus*, which, with the cormorants, must find good fishing in the shallow open water spaces amid the rushes. Of the cormorants *Phalacrocorax carbo* was the more common. On another pool a flock of eleven black swans, *Chenopsis atrata*, circled uneasily when approached, and took reluctant flight towards the river.

Our destination was a farmhouse on the river-bank. This place, together with several others passed on the way, is destined to be inundated to the roof-tree when the great weir, a dozen miles down stream, is completed. The farmer, however, is a philosopher. "Time enough to think about that in six years' time," he says.

Rabbit-trapping is a profitable sideline on this farm, and we did a night round with the trapper. The air is perfectly still and no sound was heard save the swish of feet through the long grass, the occasional cry of a night bird, or the distant yapping of a fox on the hillside. Rabbits rarely make any noise in the traps after the first struggle, but the trapper seemed to have no difficulty in finding all his sixty or seventy traps, scattered over a considerable area. When

taken out of the traps, the rabbits were killed and the gins carefully re-set. The bodies, with the ears attached, were left for the foxes, eagles, and crows. Foxes, in the experience of our trapper, rarely touched trapped rabbits, but not infrequently are caught in the traps, which they will pull up and carry away for a considerable distance, but can always be found by the keen-nosed dog. Eagles, on the other hand, will destroy the rabbits, and are given scant mercy by the trapper, who sometimes carries a light rifle on his day rounds.

Several days were spent on fishing trips, chiefly to the Mitta. As the rivers were running strongly and were full of snags, it was more comfortable and profitable to fish in the billabongs, which, in themselves, were sluggish streams, being fed by small creeks and springs from the near-by hillsides. English perch, carp, catfish, Murray perch, Murray cod and tortoises, numerically in that order, were taken. True, tortoises are not fishes, but they take any kind of natural bait. They were the short-necked, or Murray tortoise, *Emydura macquarie*. The tortoise is a very shy reptile, and usually shows no more of itself than the tip of a sharp-pointed nose, and a pale yellow eye protruding above the surface of the water. When it thinks it is observed, it makes a backward stroke with its webbed feet, and disappears, leaving scarcely a ripple. During warm weather it will sometimes bask on a log above the water, but always remains wide awake and ready to slip in sideways, or either end foremost, whichever is most convenient. There were plenty of tortoises in the Mitta lagoons, but only two were caught.

While fishing in the billabongs, one is able, between fish-bites, to admire the beauty of the deep, placid water, fringed with aquatic growths of great variety, or, passing from one to another, to observe the abundant bird life. Herons, ibises, and cormorants continually pass overhead, and occasionally a flight of Teal or Black Duck dashes past on whistling wings, or alights with a loud splash, to rise again in panic on discovering the too close proximity of man. On one reedy pool was a mother duck and a brood of six flappers. The parents splashed away, simulating a broken wing; the young ones dived and, apparently, did not come up again, though one knew that they had quietly risen within the shelter of the reeds.

In the great gums the Leatherheads or Friar Birds, *Tropidorchynchus corniculatus*, uttered their queer jargon of notes for which the children name them "chinkies" or "chow birds." Magpie-larks, *Grallina picata*, were everywhere, and their mud nests were visible in almost every tree near the water. Hawks of several kinds soared above the trees. The shrill, laughing call of the Brown Hawk, *Hieracidea orientalis*, was frequently heard above the shriller notes of the Kestrel, *Cerchneis cenchroides*. Among the branches of dead trees on the hillsides glided Rainbow Birds, *Merops ornatus*, and Wood-swallows.

Hordes of starlings, which at this time of the year go in large flocks, come from all quarters to roost in the reed-beds. They circle and wheel in perfect order, and alight for a few moments on the branches of a dead tree. In their wake comes winged death in the form of a Black-checked Falcon, *Falco melanogenys*, swiftest and fiercest of the raptors. Starlings, in flight, will turn and pursue their enemy until his superior speed outdistances them; but when they have perched, the hawk makes his dash to pick off a rising bird before they can get into formation. Several times the falcon attacks, but the starlings rise too quickly, and wheel to meet him. Finally, with a magnificent swoop, he gets among them as they leave the dead tree, and secures a victim. The impact of the strike can be plainly heard, and, with his screaming prey gripped in his sharp talons, the hawk glides to the ground. The starlings pay no heed to the tragedy going on beneath them, but circle as before. Now they dash with buzzing wings into the reeds, which rustle and bend under their weight, stay a while, with much quarrelsome chattering and flapping, and are up on the wing once more. This performance is repeated many times until, finally, all find perches; and, although the screaming is kept up a while longer, they do not rise again.

Grammatophora barbata (Kaup).—The bearded or Jew Lizard is found mostly in the Mallee and on the plains north of the Divide. It is known in all the States, but is rare about Melbourne. It may attain a length of 18 inches, is very quick in its movements, and hisses like a snake when alarmed.

PLATE VI



BEARDED DRAGON OR "JEW" LIZARD
Grammatophora barbata (Kaup)

(Photo by Chas. Barrett)

THE ROYAL BOTANIC GARDENS.

BY A. E. KEEP

(Extract from a paper read before the Field Naturalists' Club of Victoria, September 14, 1925)

That world-renowned scientific centre at Kew, known as the Royal Botanic Gardens, is a kind of Mecca, towards which the steps of every visitor to London, whether a student of botany, or like the writer, one claiming no scientific knowledge, but loving trees and flowers, naturally turns.

For nearly a century before Kew Gardens were thrown open to the public, they were a Royal domain. In fact, their foundation dates from the times of the early Georges. Queen Caroline, wife of George II, spent money lavishly on their enrichment, while the Dowager Princess Augusta of Saxe Gotha, the mother of King George III, may be considered as their practical founder, in a botanical sense. King George III and Queen Charlotte lived much at Kew, and, in a wing of the Royal Palace, which lies to your right as you pass through the main gates, the old, blind, mad King was confined, in the days of Regency. In fact, like most other great British institutions, Kew is steeped in history, and eloquent of a storied past, and to the writer, this constitutes one of its principal charms. It is this association with great names that gives that impression of dignity and spaciousness that the visitor to Kew Gardens, seeing them for the first time, will assuredly carry away. Beneath the exigencies of ruinous taxation and heavy probate duties, the beautiful pleasure grounds that surrounded the "stately homes of England" are fast disappearing. They cost too much for maintenance. Happily for the nation, however, Kew Gardens, with their wide vistas, avenues of magnificent trees, terraced flower-beds, and broad walks, remain a lasting memorial of the past. To quote Sir W. Thiselton Dyer, who, from 1885 to 1905, was their director, "Kew Gardens possess the grand manner which can be inherited, but not acquired. Wealth can be lavished on a garden, but cannot give it that dignity which is only derived from centuries of growth."

My first visit to the gardens was on April 29, 1924, five days after my landing. The spring of 1924 was wet and

backward in England, and for this reason the Azaleas and Rhododendrons, usually such a notable feature in this month, were not in their fullest bloom. I was to see them later in all their glory, in the gardens of the Villa Carlotta, on the shores of Lake Como; such a veritable feast of colour as memory loves to dwell upon.

I remember the broad walk, which is thirty feet in width and leads up to the Palm House, which, with its water-tower behind it, may be considered as the central point of the gardens. In front of this Palm House, which is of notable dimensions, is a broad terrace with stone flags, set with flower-beds, stone steps and balustrades, descending to an artificial lake. From the Palm House three great, grassy avenues, or vistas, radiate, of which two, the Pagoda vista, to the south, and the Sion House vista, to the south-west, are each more than 1000 yards in length, and of a noble breadth, flanked by avenues of magnificent elms, oaks, chestnuts, limes and beeches. The spacious green sward, as I saw it, was studded with dancing daffodils, a veritable field of the cloth of gold. Of course the consummate art of the landscape gardener is there, but it is the art that conceals art, and gives the appearance of the flowers growing wild. Elsewhere in the Dutch, the herbaceous, and more recently-constructed rock-gardens, you may see flowers planted with formal precision; but, in fact, every form and period of the gardener's art, in its highest attainment of skill, can be studied within the boundaries of Kew Gardens.

Of course, as an Australian of some 40 years residence, I naturally made my way to the Temperate House, to see once more the familiar Eucalypts, Acacias and Tree-ferns. These are to be found chiefly in the middle block of the Temperate House, known as the Winter Garden. This block is rectangular in shape and covers an area 216 feet in length by 140 feet in width, the apex of its roof being 60 feet from the ground. It was completed in 1862, at an approximate cost of £29,000. In this Winter Garden the trees that attract most attention are two specimens of the Bunya Pine, *Araucaria Bidwillii*. These trees have constantly to be reduced in height, lest they should grow through the roof. Specimens of the Norfolk Island Pine *A. excelsa*, Hoop Pine, *A. Cunninghamii*, and New Caledonian Pine, *A. Cookii*, can also be seen.

The Eucalypts, owing to limited space, can be represented only by young specimens. The winters at Kew are too

severe to allow of gum trees being grown in the open air; although further south, notably in sheltered positions in the gardens of Cornwall, and along the south coast, some varieties of *Acacias* and *Eucalypts* do quite well. The flowering season of the *Acacias* lasts, in England, from February to April; so, when I was at Kew, it was almost over, only a few trees in the Winter Garden still had blooms upon them. Wattle, or as it is termed in England, "Mimosa," is sold a good deal in the flower shops and streets of London. According to Mr. W. J. Bean, flowering branches of the Silver Wattle, *Acacia dealbata*, to the value of 400,000 francs a year are exported to England from France.

Tree-ferns, both *Dicksonia antarctica* and *Alsophila*, are to be seen growing in profusion in the Winter Garden, chiefly lining the main central path, but others are scattered in various parts of the house. It must be remembered that the plants at Kew are not grouped according to country of origin; therefore, the representative specimens of Australian flora will be found growing amidst the vegetation of China and Japan, North and South Africa, the Southern United States and Mexico, the warmer parts of Chile, the middle elevations of the Himalaya and the Andes, and most of the high mountains in the tropical regions. They are, therefore, somewhat hard to distinguish, and have not the familiar aspect of the Bush.

It was with quite a feeling of friendliness, as of an exile from home, that I came across a pot specimen of *Bauera rubioides*, and also a magnificent hanging basket of Sturt's Desert Pea, *Clianthus Dampieri*, the latter in full flower. While on this subject, I might mention that the Gippsland wildflower, *Humeca elegans*, known in England as the "incense plant," is fashionable in England as a background for herbaceous borders. I did not see it at Kew, as it was too early in the season, but at Hampton Court, where also there are most extensive gardens, I noted many clumps of it, with its long, feathery plumes, and characteristic odour.

In the Temperate House will also be found the fine collection of *Proteaceae*, such as *Grevilleas*, *Banksias*, *Hakeas*, and others, doubtless descended from the seeds which Peter Good and Allan Cunningham sent home from Australia, in the first decades of the nineteenth century. In the great Palm House will be found all the prevailing types of tropical vegetation, such as palms, bananas, cycads, screw pines and

giant bamboos. Designed by Decimus Burton, and completed in 1848, it is built upon most graceful lines, and is a noble building. Its total length is 362 feet; the transept is 100 feet in width and 66 feet in height, and each wing is 50 feet in width by 30 feet in height.

Originally some nine acres in extent, Kew Gardens have now an area of nearly 300 acres. Like our own Botanic Gardens, they are situated on the bank of a river, but they lack the undulations which give such a great natural advantage to the Melbourne Gardens. Kew is a flat plain, and such variations of contour as it possesses have been produced artificially. Nowhere has the art of the landscape gardener had to contend with greater difficulties. The soil is hungry, sands and gravels predominating, and beds of almost impervious clay. The transforming of such an unpromising area into a realm of beauty is a triumph of human skill and perseverance.

Kew possesses 16 miles of pathways, three separate museums, a herbarium with two million specimens, and a library of some 24,000 volumes. There is also the Jodrell Laboratory for research work in plant physiology; there are at least 10 glass-houses, all open to the public, and the "North" gallery of paintings of flowers and nature scenes, containing more than 800 pictures. Add to these attractions the Rose Garden, the Herbaceous Garden, the Rock Garden, not to speak of the Alpine House, the 70 acres of natural woodlands, the artificial lake, some $4\frac{1}{2}$ acres in extent, the Pagoda, the Temples, the Ruined Arch, and other relics of an interesting past, and I think you will admit that there is a little too much to be seen in two brief visits, or to be described in the limited space which our Editor can afford me.

No visitor to Kew is likely to forget the giant flagstaff, formed of a single piece of Douglas Fir, better known in Australia as Oregon, *Pseudotsuga Douglasii*. This tremendous baulk of timber is 214 ft. in height, 2 ft. 9 in. in diameter at the base, and 12 in. at the top. This is flagstaff number two. The first was put in place by the officials at Kew, and a high wind incontinently blew it down, happily without much damage. Profiting by experience, the Director secured, to erect the second flagstaff, a detachment of sailors from Portsmouth, and the "handy men," being well accustomed to masts and rigging, this time made a secure job of it.

Growing on the lawns and around the lake will be found many beautiful trees such as the Holm Oak, *Quercus ilex*; the Service Berry, *Amelanchier canadensis*; the common Lime, *Tilia vulgaris*, and the White Lime, *Tilia argentea*; the common Ash, *Fraxinus excelsior*, and the London Plane, *Platanus acerifolia*; Common Beech, *Fagus sylvatica*; Oriental Plane, *Platanus orientalis*. Many fine Horse Chestnuts, *Æsculus Hippocastanum*, and Spanish, or Sweet, Chestnuts, *Castanea sativa*, can also be seen, while one Cedar of Lebanon, *Cedrus Libani*, is no less than 64 feet in height, with a trunk measuring nearly 15 feet in girth.

Not only was Royalty intimately associated with the development of Kew Gardens, but great names in the world of Botanical Science cluster around them also—Sir Joseph Banks, who accompanied Captain Cook when he landed at Botany Bay in 1770, was one of their earliest directors. Then there were the Aitons, father and son, who were associated with the destinies of Kew for more than 80 years. Then came Sir William, and afterwards Sir Joseph, Hooker, both of whom were directors of the Gardens. Australia also has played its part in their enrichment, and, owing to the untiring labour of collectors like the Cunninghams and Peter Good, its unique flora is well represented. Mr. C. Daley has told us of the immense quantities of material that our own Baron von Mueller continued to send for more than 40 years. For the compilation of *Flora Australiensis*, published in 1878, the Baron despatched in instalments no less than one hundred thousand specimens to George Bentham at the herbarium at Kew.

More than three million visitors pass through the gates of Kew Gardens every year. Here you may see the student of botany, with his note-book, carefully studying the labels of the trees and plants, the painter with his easel, and the far larger class of photographers, with their cameras; but far outnumbering these, one notes, with pleasure, the multitude of ordinary citizens of London, people whose everyday lives are perforce passed amid sordid surroundings and mean streets, but are here, for a while, enabled to experience the joy of open spaces and the charm of woodland glades, the infinite variety of the forms and colours of flowers, and to realise something of that superabundant loveliness of Nature which, as Thomas Huxley has said, disarms pessimism.

A STUDENT OF FUNGI—MRS. FLORA MARTIN'S WORK.

We are led, by direct and indirect evidence, to believe that our Club has done much to encourage and advance the study of Natural Science in Victoria. Many members have been, and still are, prominent workers; others, not so prominent, have done excellent work, too; while there are some non-members, who are doing their share in the varied realms of Nature Study, encouraged by the Club's activities.

Mrs. Flora Martin, who died at Drouin on March 14, 1923, was associated with our Club, and recently I became possessed of special evidences of the enthusiastic work carried out by her from the time when she left Melbourne for Drouin, owing to her husband's retirement there for health and other reasons.

Mrs. Martin, in her young days, was a lover of plants, and a diligent student of botany. In her early association with the Club she devoted much time to the study of Fungi. In 1892, when I was arranging the Museum of Economic Botany in the Melbourne Botanic Gardens, and had prepared a showcase of some remarkable specimens of Fungi, donated by the Royal Botanic Gardens, Kew, Mrs. Martin contributed a collection of named Victorian species for inclusion in the case. Evidences of this lady's continuous and devoted scientific interest, and excellent work in her chosen field, are to be found in a number of volumes, which, but for the kind offices of a relative of mine, who owned the property adjoining Mrs. Martin's farm, might, with numberless botanical specimens, sketches, coloured plates, and drawings of fungi, have been destroyed as valueless, after the disposal of other property.

While spending a week-end at Drouin recently, I looked through a pile of coloured drawings and illustrative notes of fungi made by Mrs. Martin during her studies, and put a large number of them together, in case they might be of service to the Agricultural Department or members of the Club. A presentation copy to Mrs. Martin, of Cooke's *Handbook of Australian Fungi*, has the following inscription

signed by the author over his photograph—"In kindly remembrance of the good offices of Mrs. Flora Martin in advancing this work in the colonies, and in securing its official recognition, my thanks are ever due." This volume was exhibited by me at the September, 1925, meeting of the Club, together with the letter from the New South Wales Government to Mrs. Martin, intimating its decision to contribute £150 towards the cost of the work.

Another interesting volume is a copy of *Synopsis of the Queensland Flora*, by F. M. Bailey, presented with the author's compliments to Miss Flora M. Campbell (Mrs. Martin's maiden name), dated 4/8/83. The same author sent his later publications, down to March 28, 1913, when Mrs. Martin received a copy of the beautifully illustrated work, *Comprehensive Catalogue of Queensland Plants*, with the following inscription—"To my old friend, Mrs. Martin, who has done such good work in connection with Australian Fungi." A volume, much studied, judging by the multitudinous marginal notes, and underlinings throughout, is Balfour's *Classbook of Botany* (Part 2, Physiological Botany) inscribed—"Flora M. Campbell, 1874," while a copy of *Outlines of British Fungology*, by the Revd. J. M. Berkeley, was freely annotated by Mrs. Martin, and marked off with numbers, probably corresponding to specimens in her possession. Many other books, such as *Diseases of Plants, Timber and Some of its Diseases*, both by Marshall Ward; De Bary's *Comparative Morphology and Biology of the Fungus, Mycetozoa and Bacteria*, and *British Fungi, Lichens, etc.*, Holmes and Gray, together with a complete set of Bentham's *Flora Australiensis*, testify to the thoroughness of Mrs. Martin's studies. My relative at Drouin states that Mrs. Martin had correspondents on botanical matters all over the world, that she was always experimenting with plants on her farm, and that she never possessed a piece of dead wood without inspecting it for Fungi. Part of her farm was left in its natural state, purposely, as a sanctuary both for birds and plants.—F. Pitcher.

Orchid students are reminded that this is the time to look for the unusual form of *Calochilus* which appeared two seasons ago. The absence of the "beard" was its most marked characteristic. The plant was somewhat stouter than that of *C. Robertsonii*, and it bloomed rather earlier.—E.C.

A VICTORIAN GEOLOGICAL PIONEER.

BY F. H. CHAPMAN.

One of the outstanding and praiseworthy objects of this Club in the past has been the recognition and memory of the pioneer in science and natural history generally, especially in regard to Victoria. Although the present subject of notice was not a member of the Club, that body has derived indirect, but none the less substantial, benefit, from the knowledge accruing from his work. And with this in mind the following notes are offered* :—

Reginald Augustus Frederick Murray was a native of Perthshire, Scotland, and came out with his family in 1885 to join his father, Capt. Virginius Murray, who was Warden and Police Magistrate on the goldfields. When, on the death of his father in 1861, the family recrossed the sea, young Murray remained behind. He joined the Victorian Geological Survey, under Selwyn, at the age of 16, and found his first experience in the Wilkinson-Daintree field party engaged in surveying the Bacchus Marsh and Ballan districts. When 18 years of age he is found exploring the almost unknown Otway Range country under Wilkinson, their route being from what is now Lorne (Loutit Bay) to the mouth of the Gellibrand River, and thence to Warrnambool. Wilkinson and Murray also made a secondary trip at this time, penetrating the forest from the mouth of the Aire to Irrewillipe, west of Colac, when the Beech Forest was discovered.

As a junior assistant of the Survey, in 1865, Murray was employed in surveying Steiglitz and Meredith, and along the Leigh River to Buninyong. This work terminated in 1869 with the abrupt ending of the survey. Subsequent years find R. A. F. Murray engaged in surveys for Commissions, etc., at Ballarat and Alexandria, and in 1871 he was appointed by the Government to make a survey of the Bendigo goldfield. His later years in the field were mainly spent in Gippsland, where he did such fine exploratory work in the then thick forest country of North and South Gippsland. Murray was

appointed Government Geologist in 1881, which post he resigned in 1897.

The large and solid amount of work carried out by Murray is seen in the long list of reports and maps compiled by Mr. D. J. Mahony, M.Sc., as an appendix to Mr. Dunn's admirable account of Murray's life and achievements. This list comprises about 154 reports and 38 geological maps and sections.

But Reginald Murray will, perhaps, best be remembered by his practical and conscientiously-written handbook on the Geology and Physical Geography of Victoria. So well-balanced were Murrays views of the different authorities when this was written, that it had been taken as a basis of knowledge of Victorian Geology up to the date of its publication. Its value was appreciated by so eminent a critic as Sir Archibald Geikie, who relied chiefly on Murray's text-book for the written paragraphs on Victoria in his widely-read "Text-book of Geology."

And here the writer would like to say how fundamentally useful Murray's work was to him when becoming acquainted, whilst in London, with the details of Victorian geology. Investigating the occurrences of the Tanjilian fauna in Gippsland, which are characterised by the large, cockle-like shell, Panenka, discovered by Murray at Tanjil, the writer was assisted by further notes from Murray. It was pleasant to have met him on one occasion, a few years since, and to have had opportunity of expressing one's appreciation of his long life's work. In a recent letter to the writer, Sir T. W. Edgeworth David expressed himself as having a high regard for Murray's work.

During the last 20 years this geological pioneer of the Selwyn regime had lived in seclusion at Willowgrove, on the Tanjil River. He passed away at Caulfield during the last month at the good age of 79 years.

Fossil species named after Murray, which will help to keep his memory green, are the *Tryplasma murrayi*, Eth.fil., a silurian coral from Waratah Bay, and the *Salishuria murrayi*, of McCoy, a Ginkgo leaf from the Tertiary at the head of the Dargo River. This latter, however, is still an MS. name.

*The writer is largely indebted to the Biographical Sketch of Murray, written by E. J. Dunn, F.G.S., to which is appended a full list of Murray's publications, by D. J. Mahony, M.Sc.—Bull. Geol. Surv. Vict., No. 23, 1910.



WIRE-FENCES DEATH-TRAPS FOR BIRDS.

Since the establishment of settlement in Victoria, the native fauna has been contending with many enemies. Apart from the destruction caused by foxes and "wild" domestic cats, the barb and plain-wire fences have taken toll of our birds and animals. These fences often are concealed in dense scrub, or long grass, and are constantly proving death-traps to many wild birds. Recently, in the scrub at Mooroolbark, I came upon a fence which had just added another victim to the list. Suspended by the right wing from the top barb-wire was a Laughing Kookaburra, *Dacelo gigas*, who had been caught and firmly held by one of the pointed barbs. The feathers at the wound had become so twisted and knotted that the unfortunate bird was unable to free itself. Here it had lingered for at least two days before dying. When discovered, about three days later, it presented a starved and miserable appearance. With the exception of the wound at the wing, and a little skin off its legs, no blemishes were visible. Although the pointed barb had penetrated just under the skin at the elbow of the wing, yet the bird was held so firmly that I had difficulty in removing it from the wire.—D.D.

NATIVE CATS NEAR MELBOURNE.

The Great Spotted-tailed Native Cat, *Dasyurus maculatus*, or "Tiger Cat," as it is commonly called, is now rare in Victoria, but the Common Native Cat, *D. viverrinus*, has adapted itself to changed conditions, and occurs still even close to Melbourne. The National Museum received specimens from Studley Park, fairly recently, and on October 26 last a young one was captured in a coachhouse at Ivanhoe. It was discovered early in the morning in a chaff-bin, and later entered a wire-trap. Its captors presented it to the Zoological Gardens, where I stalked it with a Graflex camera.

Mr. A. Wilkie, the director, had the little marsupial placed in a large enclosure, and, with much trouble, a portrait was obtained. The "Cat" was so nimble-footed and clever at dodging the lens that only one of six snapshots was successful. We admired the animal's boldness. It displayed anger, not fear—a fierce nature. These small *Dasyures* are known to be poultry-killers, and in some districts many have paid the penalty for raiding.—C.B.

THE BLACK-FACED WOOD SWALLOW.

Has the Black-faced Wood-swallow, *Artamus melanops*, been recorded for Victoria? During the last two years I have seen odd pairs throughout the year, in Red Cliffs district. It is apparently a resident species, or perhaps more correctly, nomadic. Its favourite haunt is along the roads, and it nests in tree-spouts and on the tops of stumps. In the circumstances its chances of rearing young are slight, for school-children have no difficulty in finding such exposed nests. In nests that I have examined, two eggs have formed the clutch.—L.G.C.

BIRD STRATEGY.

The White-eared Honeyeater, *Meliphaga leucotis*, is a master strategist. It is true that his clear call, "We-rock," sounding all day long, may guide you toward his home; but he calls from the tree tops, while the nest is in the bushes below, and how silent he is when he approaches it! Should some thoughtless human step too near, the bird will drop like a stone, and flutter along the ground with dragging wing. If the watcher refuse to be lured away, the bird cries plaintively; no Tang, *Epthianura albifrons*, could do better, and Tangs are masters of this art. Should you, the dreaded intruder, retreat a few steps and hide, anxiety conquers wisdom, and the honey-eater darts to the nest to make sure that the brood is safe. You move, he is gone; you approach the nest and he is fluttering again on the ground, while, within a cup of bark and hair, two nestlings that, a moment ago, called, with outstretched heads, for food, crouch flat and still, two patches of striped-grey down, almost invisible from a step away. You touch them, and the parents, seeing there is no longer hope of misleading you, dart downward, in fear for their offspring. Again and again they strive to drive the intruder away, but if this avail nothing, they

will not allow their own fear to harm the nestlings, but, even while a strange hand touches the nest, they doubtfully hop toward it, from branch to branch, with food that they place at last within the wide mouths, whose owners have forgotten caution in their hunger.

While the young are still in the nest, the parents can do no more than this, yet this is only the beginning of their care. When they first leave the nest, if you approach too near the first trick is repeated; and, be it noted, so far as I have seen, once the nest is found the birds do not try and lead you away, but as soon as there is something new to hide they try again to mislead. If this fail they have another defence. I have seen a pair, with a young bird, fly most noisily and ostentatiously across a paddock, flying low and turning sharply to return to the bush they left; but only the parents reached it. Walking to the point at which they had turned, I discovered a large tussock, and behind it, flat and silent, the young bird. I bent down, but with a flash of tiny wings the fledgling had returned to its parents. I followed again; would have touched that young bird, but, between my hand and its body, darted two furious birds, with mandibles, too angry, it seemed, to fear; and, in admiration, I left them alone.—J.G.



TWO ORCHIDS OF WESTERN AUSTRALIA.

The illustrations show two orchids of Western Australia which were exhibited at our Flower Show on September 22. Neither, so far, has been recorded in this State: though, being very small and not brightly coloured, they may easily have been overlooked by the collector.

Caleana nigrata (Lindley).

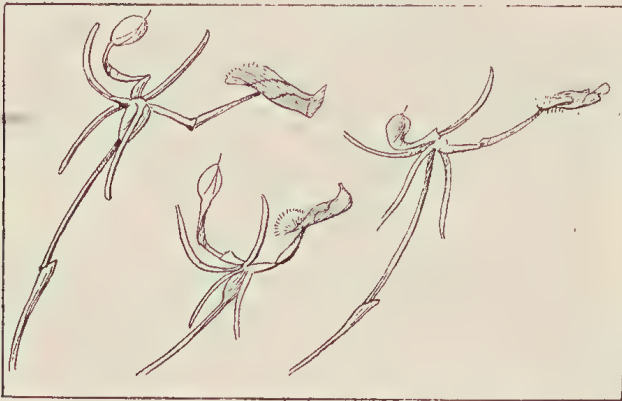
In this species the labellum hangs poised above the column on the same peculiar strap-like hinge, which we note in our

Victorian species of *Caleana*. The flower is inverted, the labellum being above, instead of below, the column. My specimen, although gathered some days before September 22, shows no sign of fading. It is probable that, as in the



CALEANA NIGRITA (H. P. Dickinson, Del.).

case of *Caleana major*, which often remains in flower for six to ten weeks, this is due to non-fertilization. At first glance the flower seems to be cleverly adapted for cross-pollination, and no doubt it is occasionally fertilized by visiting insects,



DRAKEA ELASTICA (H. P. Dickinson, Del.).

but closer examination would show that this may not be so easily effected as appearances indicate.

The resemblance to the flying duck in *Calceana nigrita* is not so pronounced as in the Victorian species of this genus, in which the broad, hollow, cup-like formation of the back part of the labellum, and the narrow, beak-like, shape of the front part, make a faithful copy of the head of the bird.

Drakæa elastica (Lindley).

Though this orchid is not on the Victorian list, we have two closely-allied species, which were formerly classed as *Drakæas*; but Lindley's genus, *Spiculæa*, being reinstated, these have become *Spiculæa Huntiana* and *Spiculæa irritabilis*.

In *Drakæa elastica* the hammer-shaped labellum is very sensitive, and the long column is characteristic of the genus. The lamina of the labellum is divided into two unequal lobes by a constriction near the insertion of the claw. Longer lobe markedly glandular; hairy in the basal half, elsewhere smooth, upturned at its free extremity; shorter lobe hairy and very glandular. Anther blunt, but rostellum much prolonged so as to simulate another point.

From first-hand knowledge I can say little of *Drakæa elastica*, as this is my introduction to it. The above is Dr. R. S. Rogers' description, which would, I think, be better than that of either Fitzgerald or Benthame.—S.C.

Part III of Mr. J. M. Black's *Flora of South Australia* is ready for the printer, but must wait its turn with other publications of the British Science Guild. Mr. Black and Dr. J. S. Rogers have ungrudgingly given a great amount of time, with their only reward, appreciation by fellow-workers in the field. South Australia is fortunate in having scientific men who have both leisure and ability for such work. In Victoria we have provided an up-to-date census of plants, but figures and descriptions are lacking.—A.J.T.

The Kew *Bulletin*, No. 8, 1925, refers to the effort being made by the Committee on Australian Botanical Nomenclature to conserve the generic names, *Muehlenbeckia*, *Denhamia*, *Oreomyrrhis*, *Leucopogon*, *Olearia* and *Angianthus*, which are all ante-dated, the first threefoldly. The reasons for retaining them are published in the *Journal of Botany*, July 1925, pp. 210-213, by Mr. J. M. Black, secretary of the Committee, and it is to be hoped that the next International Botanical Congress will see fit to add them to the list of *Nomina generica conservanda*.

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EXCURSIONS.

SATURDAY, NOVEMBER 14.—Eltham. Object: Birds. Leader: Mr. W. Tonge. Meet Princes Bridge Station in time for 1.20 p.m. train.

SATURDAY, NOVEMBER 21.—Frankston. Object: Botany. Leader: Mr. J. W. Audas. Meet at Flinders Street Station in time for 1.20 p.m. train.

SATURDAY, NOVEMBER 28.—Bunyip. Object: Botany. Leader: Mr. H. B. Williamson. Meet at Flinders Street Station in time for 7.40 a.m. train.

SATURDAY, NOVEMBER 28.—Kororoit Creek. Object: General. Leader: Mr. A. E. Rodda. Meet at Flinders Street Station in time for 1.30 p.m. train.

SATURDAY, DECEMBER 5.—Sherbrooke Gully. Object: Birds and General. Leaders: Messrs. C. Barrett and E. E. Pescott. Meet at Flinders Street Station in time for morning train.

SATURDAY, DECEMBER 12.—Lilydale, Ruddock's Quarry. Object: Fossils. Leader: Mr. F. Chapman. Meet at Flinders Street Station in time for 12.15 p.m. train.

XMAS EXCURSION.—Wilson's Promontory. Members desiring to join this excursion must hand in their names, and deposit one pound at the October meeting.

FOUNDATION DAY WEEK-END EXCURSION TO MORNINGTON.—A very interesting programme has been drawn up for this excursion by the leader, Rev. G. Cox. Members intending to take part in this excursion should hand in their names at once to the Hon. Sec., so that accommodation may be reserved.

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— OF —

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th DECEMBER, 1925.

1. Correspondence and Reports.
 2. Election of Members.
-

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

By Mr. F. Cudmore—"A Complete Corallum of the Fossil Coral-Thamnastraea sera, Duncan."

By Mr. J. A. Ross—"The Amoebae and Their Structure."

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, on Monday evening, November 9, 1925. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

CORRESPONDENCE.

A letter was received from the Hon. Secretary of the Bass Park Trustees in reference to the interesting lime deposit in the Park. He stated that the Trustees were protecting the deposit for scenic reasons, and had resisted several attempts to have the lime removed.

REPORTS.

Reports of excursions were given:—Ringwood, Mrs. E. Coleman; Spring Vale, Mr. H. B. Williamson; Greendale, Mr. F. G. A. Barnard; Belgrave, Mr. F. G. A. Barnard. A vote of thanks to Dr. and Mrs. Shuter and Mr. and Mrs. Coghill for their hospitality to excursionists on the Greendale and Belgrave excursions, respectively, was carried unanimously.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Milbourne, 257 Beaconsfield Parade, Middle Park, Mr. E. S. Hanks, 736 Sydney Road, Coburg; and Mr. L. R. Williams, Glyndon Avenue, Brighton, were elected as ordinary members; and Mr. and Mrs. S. S. Strutt, "Hanslett," Tongala, as country members of the Club.

GENERAL.

Mr. F. Pitcher reported that he had obtained from the Trustees of the National Park particulars of the proposed parking area at Sherbrooke. They stated that the spot was outside the area under their control, and that no damage would be done to the Park or adjacent beauty spots.

LECTURE.

“Central Australia,” by Mr. Lance Le Souef. The lecturer described various parts of the interior, in Western and Central Australia, sketched phases of life on the stations, and gave an account of the “desert” country’s progress and prospects. Vast areas, popularly supposed to be worthless, or nearly so, were in reality well suited for sheep or cattle. There was a great future before Central Australia when modern transportation facilities were provided, and adequate means for obtaining the water that existed underground. The lecturer dealt with plant and animal life in the interior, mainly from the economic standpoint. Several members expressed keen appreciation of the interesting and enlightening lecture, which was illustrated by a number of excellent lantern slides. On the motion of Messrs. Pitcher and Barnard, a hearty vote of thanks was accorded Mr. Le Souef.

EXHIBITS.

By Mr. F. G. A. Barnard: King Fern, *Todea* (*Osmunda*) *barbara*.

By Mr. F. Chapman, A.L.S.: Tertiary leaves from Ten-mile Creek, Narracan.

By Mr. Geo. Coghill: The following flowers grown at Canterbury:—*Grevillea rosmarinifolia*, *Viola hederacea*, *Swansea*, sp., *Prostanthera nivea*, *Kunzea parviflora*, and the New Zealand Manuka, *Leptospermum*, sp.

By Miss Currie, of Lardner: Cocoons and perfect insects of a small Chalcid fly.

By Mr. J. E. Dixon: Remarkable variation of *Macrohelodes crassus*, Blackb., a beetle of the family Dascillidæ; about 30 varieties from Frankston.

By Mr. Latham: Blooms of *Callistemon lanceolatus*.

By Mr. A. E. Rodda: Tall growths on branch of *Acacia*, from You Yangs.

By Mr. H. B. Williamson, F.L.S.: Specimens of *Pimelea Treyvaudii* (F.v.M.), Ewart and Rees, Tallangatta, October, 1925. Flowering specimens of *Pultenaea graveolens*, Tate, Steiglitz, Mr. E. Cooper, snr., previously gathered only by Mr. S. Johnson, of Meredith, in 1893, and placed with specimens of *Pultenaea villosa*, Willd. Specimens of:—*Casuarina Leuhmannii*, R. T. Baker; *Myoporum deserti*, A. Cunn.; *Calotis anthemoides*, F.v.M.; *Brachycome basaltica* (var. *gracilis*), F.v.M.; *Rumex crystallinus*, Lange, from the plains of the Lower Ovens; *Halorrhagis elata*, A. Cunn., Warby

Ranges. All collected by the exhibitor, and new for N.E. *Burnettia cuneata*, Lindl., and *Thelymitra grandiflora*, Fitz., collected by Fred. Barton, jr., at Foster; new for East. *Prostanthera decussata*, F.v.M., Brisbane Ranges, collected by Mr. Boardman; new for S. A scrap of this plant was obtained in 1923 by the Rev. A. C. F. Gates.

THE PROPAGATION OF OUR PTEROSTYLES.

BY W. H. NICHOLLS.

(Communicated by A. J. Tadgell)

The pollinary mechanism in our orchids, especially the well-known *Pterostylis*, popularly called Greenhoods, is of a highly specialised nature, and is described by Dr. R. S. Rogers in his "An Introduction to the Study of South Australian Orchids," 1911. As there is no authentic record of the finding of seedling plants, especially in the very early stages of their existence, the discovery this spring of a number of undoubted seedlings is of interest to all who love to study these curious and fascinating flowers.

It is a well-known fact, or a matter of general belief, that most, and perhaps all, terrestrial orchids propagate their kind chiefly by the vegetative development of tubers on the main root or at the terminals of the wandering roots. In a state of nature these *Pterostyles* are found sometimes solitary, sometimes in small scattered groups, at other times in colonies so dense that the ground for yards is carpeted with their rosettes, as is the case with *Pterostylis concinna*, R.Br., *P. nutans*, R.Br., and *P. pedoglossa*, Fitz. These three species are cited as being common plants in the neighbourhood of Melbourne. *P. concinna* is quite the commonest orchid under the tea-tree along the coast. *P. nutans* is found there, and practically everywhere else, while *P. pedoglossa* hides its frail charms among the stems of shrubs that flourish on our sandy heathlands.

In September last the writer received from New South Wales an excellent example of the above vegetative process in *P. curta*, R.Br. This specimen was collected by the Rev. H. M. R. Rupp, on Hungry Mountain, in the Pater-

son district. The plant produced four tubers. It appears to be plentiful in that district, growing intermixed with *P. nutans*. On the other hand, it must not be conceived that the wonderful mechanism perfected by nature to ensure production of fertile seed, is peculiar to the Greenhoods, or without result. This, indeed, is far from being the case, for sufficient proof is available to show that seed production is of paramount importance for the spread (if not the existence) of this and many other genera.

An examination of the plants of the various species in different seasons proves that many of them, with their limited root systems, are quite incapable of producing more than a single tuber each year, such tuber being for the sustenance of the plant when next it vegetates. It will be found that the majority of these produce seed capsules freely or frequently. The best known instances are *Pterostylis longifolia*, R.Br., *P. alpina*, Rogers, *P. rufa*, R.Br., *P. obtusa*, R.Br., *P. barbata*, Lindl., *P. mutica*, R.Br., and *P. decurva*, Rogers. These species are rarely found other than as solitary specimens, or in small groups, though one may occasionally find, as for example, when in 1923 and 1924, we crossed the Baw Baw Plateau, *Pterostylis alpina* occurring very plentifully, the plants being huddled together in large groups as if for protection from the icy cold of these regions.

A visit now to any of the coastal districts where we find *Pterostylis concinna*, R.Br., *P. nana*, R.Br., or *P. alata*, Reich., growing, will show that even with those types which chiefly propagate their kind by the underground production of tubers there is abundant seed produced. That plants are produced from this seed is evident by the hundreds of very small plants which are observed in some seasons. *Pterostylis Toveyana*, Ewart and Sharman, a very rare coastal form, is an undoubted hybrid, the parent plants being *Pterostylis concinna* and *P. alata*.

Occasionally, when the season is suitable to their growth, many of our rare *Pterostylis* appear in considerable numbers in some districts. An instance of this occurred during the spring of 1923, when near the Bayswater Railway Station we found *Pterostylis acuminata*, R.Br., growing in large numbers. Prior to this discovery it was very rare; this year we found none at all.

Specimens collected at Bayswater, N.W. Victoria, Cravensville and Mordialloc, are identical in all respects, but those from New South Wales and Queensland differ in having a more acuminate labellum. The months of blooming in

New South Wales are March to June; in Queensland, July and August; and in Victoria, August to December.

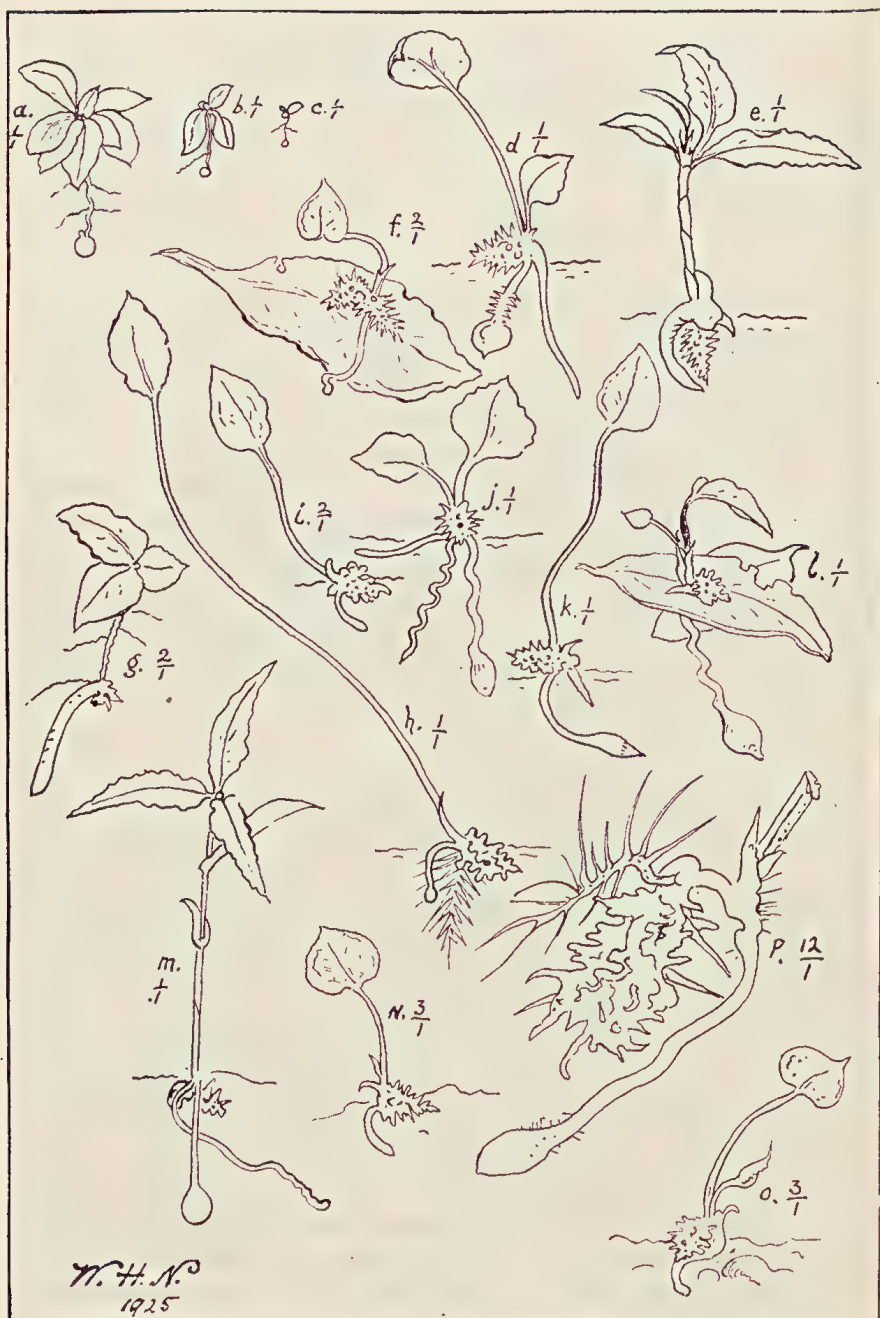
Dr. Rogers, who is familiar with the types from the other States, writes: "It is not a hybrid, but *P. acuminata*." He also mentions the slight difference in the labellum, and in the flowering times. It will thus be seen that this orchid is found in flower in one place or another in all months, except January and February.

On a recent excursion to Gippsland, the writer had the good fortune to locate a colony of *Pterostylis longifolia*. While his party rested by the roadside, the writer examined a likely-looking spot for orchids under a grand old Eucalyptus tree. A thick carpet of wet leafmould lay upon the ground. Growing in this were many plants of this species in all stages of development, from minute seedlings to flowering plants. Many of the smaller seedlings rested on solitary leaves, their rootlets searching, through cracks and over the edges of the leaves, for the cool moisture beneath. None of these plants were rooted in the soil proper, and specimens of all were readily removed without damage. These, together with specimens found at Mount Evelyn and other places, form the subject of our illustrations.

On the basalt plains not far from Sunshine there is a largish colony of *Pterostylis reflexa*, R.Br. A recent visit revealed further interesting evidence, proving beyond all doubt that those species which are found in colonies do produce abundant and fertile seed. Within ten feet of a carpet of large rosettes, and a little below, there is a deep and widely-cut drain. Lining the bottom and sides were numerous small rosettes. They could not be other than plants of the above species, which had originated from seed, as, upon enquiry, I found the drain to be of comparatively recent construction. All of these plants and those in the immediate vicinity were quite small, many rosettes measuring but a quarter of an inch across.

In this locality the grass grows very tall, and burning-off is practised nearly every summer. Possibly the heat and the after-effects are beneficial to the germination of these minute bodies, which probably had been blown or washed into the drain, and there found an ideal home in the loose, unoccupied surface of the soil.

In the B.A.A.S. Handbook of South Australia (1914), Dr. Rogers writes: "... that during seasons following extensive bush fires, the hills become veritably carpeted with

Seedling Plants of Some Species of *Pterostylis*.

(Drawings by W. H. Nicholls)

orchids, many of the species being comparatively rare at other times. The plants are far too numerous to be accounted for by stimulation of the buried tubers, and the probable explanation appears to be that the fires have created conditions favourable for the germination of seeds dormant from former seasons."

Other discoveries could be cited relative to the growth and spread of our *Pterostyles* in this manner, but enough has been written to show that these special contrivances (so clearly described by Dr. Rogers), and characteristic of all orchids, serve a very useful purpose, and that, without fertile seed, many species would soon be lost for all time.

KEY TO ILLUSTRATIONS

a.b.c.—Seedling plants of *Pt. reflexa*, Sunshine, June, 1925; d.e.f.—Seedling plants of *Pt. longifolia*, Drouin, October, 1925; g.—Seedling plant of *Pt. vittata*, Black Rock, May, 1924; h.—Tall seedling plant of *Pt. longifolia*, Drouin, October, 1925 (note the "feathery" rootlet); i.j.k.l.m.—Seedling plants of *Pt. longifolia*, Drouin, October, 1925; n.o.—Seedling plants of *Pt. parviflora*, Mt. Evelyn, September, 1925; p.—Enlarged root system of seedling plant of *Pt. longifolia*.

PLANTS FROM MALLACOOTA DISTRICT.

On a recent visit to the Mallacoota district, East Gippsland, Mr. V. Miller found the beautiful crimson-flowered *Grevillea Victoriae*; but it is not recorded from East Gippsland in our Census, which will now read, "N.-E., E." On Mount Bogong the leaves of some plants of this species are very long, while on others they are shorter and more ovate in shape. Mallacoota specimens are referable to the form known as *G. Victoriae* var. *brevifolia*. This Royal *Grevillea* evoked an outburst of enthusiasm when first found by Baron von Mueller (who regarded the Alps as its proper home), when he wrote to Sir William Hooker; "What an introduction to Kew this plant would be—a plant that requires no protection in England." Mr. C. Barrett brought back from Mallacoota, among many other interesting plants, the Short Bristle Fern, *Trichomanes humile*, only recorded previously from Mount Bogong and the Dandenongs. Thus the Census should be altered to read, "S., N.-E., E."—A. J. TADGELL.

THE LATE MR. JOSEPH HENRY MAIDEN, I.S.O., F.R.S., F.I.S.

The report of the death of Mr. J. H. Maiden, at Turramurra, N.S.W., on November 15, at the age of 67 years, was received with very great regret, both by those who had the privilege of knowing him personally, and those who knew him only as Australia's leading botanist, and had been following with so much interest the progress of his great work on the genus *Eucalyptus*.

Many of us were unaware that, for a long time, Mr. Maiden had been so seriously crippled in health that he had been greatly hampered in his task. His heroic struggle, in face of his painful disabilities, to bring it to completion, aroused deep admiration in all his friends; and, although his end, as the result of heart failure, did not come as a complete surprise, yet it caused a feeling of regret and disappointment that he was not permitted, by the publication of the final number of the "Revision," to crown what he has described as his life work.

The decision of the Minister for Forests to terminate the publication of "The Forest Flora of New South Wales," which was begun in 1904, and had reached its 77th part last year, must have been a matter of regret to Mr. Maiden; but in the distressing circumstances in which he was working, perhaps he was not altogether sorry to have been relieved of its responsibilities, so that he could devote all his remaining energies to his main objective.

Until his death, in 1896, Baron von Mueller had been the undisputed authority in all concerning the Australian flora. Indeed, he had for so long occupied this position that he had come to look upon the field as his own domain, and, perhaps with some justification, was even inclined to regard the description by another of any new species, more particularly in his pet genus *Eucalyptus*, without his imprimatur, as an intrusion within his province, and even as something perilously verging on an impertinence. Just before the Baron's death, however, Mr Maiden, in conjunction with the late Mr. Henry Deane, had commenced to participate in the elucidation of our great and perplexing genus, and the description of their first species, *E. propinqua*, appeared in

the *Proceedings of the Linnean Society of New South Wales*, in 1895. Up till 1901 nine papers by these gentlemen, entitled "Observations on the Eucalypts of New South Wales," had appeared in the same publication, and, as the result of their collaboration, 14 species were created.

Mr. Maiden thereafter published most of his species independently, and has created altogether some 88. He was, however, joined with others, notably with Mr. R. H. Cambridge, and with Mr. Blakeley, in the differentiation of 23 additional, and, according to report in a paper quite recently given to the Royal Society of New South Wales, a further 16 species are to be credited to him and the latter.

In 1893 the first part of "The Critical Revision of the Genus *Eucalyptus*" came from the press. With the exception of 1906 and 1909, each year has been marked by the appearance of one or more parts, even as many as seven being published in 1921, and six the following year. This year the 64th became available to us. In these Mr. Maiden has dealt with the genus in the most exhaustive manner, and the latest species admitted by him brought the total of those considered valid to 361. Apparently only the rest of the seeds, the descriptions of the seedlings, which are to be figured in colour, and the key remained to be published. Seeing that this last was in his own words "really the main object in writing the work," it is a relief to learn that he had completed it before his death, and that it is now in the press, and will ultimately be published. Even from the time of his arrival in Sydney, 44 years ago, Mr. Maiden's life was always actively devoted to the cause of science. He was at first assistant to the late Professor Beattie, but was soon appointed the first Curator of the Technical Museum in Sydney, in 1881, holding this office until 1896. In the interval he also acted for a time as Superintendent of Technical Education and Consulting Botanist to the Departments of Agriculture and Forestry. In 1896 he became Government Botanist, Director of the Botanical Gardens, and officer-in-charge of the Centennial Park, and held these appointments until his retirement last year, having in this period originated and built up the very fine National Herbarium, now existing in the sister State.

In addition to his official duties, Mr. Maiden undertook many of an honorary character, and was, citing only the more important—Permanent Honorary Secretary, and local Honorary Secretary for New South Wales, to the Australian Association for the Advancement of Science for 14 years, resigning on account of ill-health in 1921, and being then

elected an Honorary Life Member for his valuable services. He was for some time Honorary Secretary to the Royal Society of New South Wales, President of the Horticultural Society of that State, President of the New South Wales Branch of the Australian Forest League, and helped in the origination of the Wattle Day celebrations.

Besides the two large works already referred to, Mr. Maiden was the author of the well-known "Useful Plants of Australia," "Illustrations of New South Wales Plants," a "Life of Sir Joseph Banks," and, with the late Mr. Ernest Betehe, "A Census of New South Wales Plants." He was, moreover, responsible for 45 papers in the *Transactions of the Royal Society of New South Wales*, 95 in the *Transactions of the Linnean Society of New South Wales*, and for many others in the "Agricultural Gazette of New South Wales," and in this and similar journals.

That Mr. Maiden's work has been recognised, and that it has not gone without honour, is evident when we remember that he received the Linnean Society's medal in 1915, being the first to be so distinguished in this country; that he was elected a fellow of the Royal Society and also received the Imperial Service Order in 1916, the Mueller Medal from the Australian Association for the Advancement of Science in 1922, and the Clarke Memorial Medal from the Royal Society of New South Wales in 1924.

Mr. Maiden's kindly disposition endeared him to all those with whom he came in contact, his devotion to duty in spite of long continued ill-health earned him universal respect and the loss his death has occasioned will not be easily overcome.

BALD COOT FEEDING.

At Lake Wendouree, Ballarat, last December I was interested in watching the aquatic birds through binoculars. A Bald Coot, *Porphyrio melanotus*, perched on a tangle of weeds, was tugging at the flower-stem of a large plantain-like weed that grows thickly in the lake. The stalk came away suddenly, and the big blue bird fell backward into the water. Recovering his perch, he held up the stem with one foot and peeled it with his bill, as one would peel a banana, afterwards feeding on the succulent centre. I have noticed Coots, *Fulica atra*, diving for, and eating, weeds in other waters. Doubtless the birds of this family are useful in helping to keep down these troublesome growths.—
A. E. RONDA.

AN ISLE OF ROMANCE AND REALITY.

In a naturalist's life romance is mingled often with reality, though some men are slow to admit that they have gained pleasure, stepping aside from the straight path of science. Facts alone, they say, are worth remembrance, and should be recorded starkly. But many of us are nature lovers rather than scientific naturalists, and in beholding the beauty of wild life we may win—and be the richer for it—glimpses of romance. There is true romance in the story of Dunk Island, as told by the late Mr. E. J. Banfield, in "The Confessions of a Beachcomber" and other books. But not romance alone. For their author was a keen and faithful observer, and missed none of the opportunities offered by Fortune lavishly.

"Last Leaves from Dunk Island," published in November by Messrs. Angus and Robertson Ltd. (Sydney), is a notable addition to Australian books of the open air. The "leaves" will help to keep green the memory of a sane and "great-hearted man," who loved nature more than science, who wrote wisely and with a golden pen, and made his island home renowned in many countries besides Australia. Since Thoreau's time no naturalist-recluse so remarkable as E. J. Banfield has told the world the story of his life with wild nature, and recorded his thoughts, observations, and expounded his rich philosophy.

In his Introduction, written with rare insight and sympathy, Mr. A. H. Chisholm gives a brief biography of the self-styled "Beachcomber," who, with his wife, lived on Dunk Island for 25 years. The tropic idyll ended, as all idylls must, sorrowfully. Death came at last to the tropic isle. Some among us have been on Dunk Island; few have not read the Beachcomber's books. Nothing in Australian literature is more distinctive than "The Confessions of a Beachcomber." Its author has enriched our national literature, and, also, he has added not a little to the knowledge of plant and animal life in North Queensland—his territory an isle of romance. His bird biographies are perfect in their way; of beach plants and trees and flowers of the jungle he wrote as excellently. Birds were favourites, yet our friend, especially in his later years, was most loyal to botany. Like all true naturalists, he declined to be exclusive. The specialist has his place—a high one; but the great men have nearly all been general in their studies (specialising, too, maybe)—as Darwin, Bates, and Wallace.—C. BARRETT.

THREE SPECIES OF PIMELEA.

BY H. B. WILLIAMSON, F.L.S.

The genus *Pimelea* belongs to the family Thymelaeaceae, which includes the *Daphne* of the Northern Hemisphere, *Gnidium* and *Struthiola* of S. Africa, and the prostrate alpine shrub, *Drapetes*, of the Tasmanian highlands and the Australian Alps.

The members of the family are noted for the great tenacity of the inner bark, and the genus *Pimelea*, which is limited to Australasia, has been referred to under the vernacular "Tough-barks." The genus contains 78 species, 22 of which occur in Victoria, one of which, *P. simplex*, however, appears to have been wrongly recorded for the State. Of these 22 species, 14 have been recorded for the Melbourne district, one from the Mallee and the S.W. and S. coast, and the remaining seven are each limited to one district. With the aid of Mueller's key, and the information regarding distribution given in the Census, a beginner should not have great difficulty in making out any of the common species. Mueller's key to the genus is well set out, and is as easy to follow as any in the book, the distinctions being based on the leaves—whether scattered or alternate, incurved or recurved, calyx and bracts hairy or glabrous, flowers terminal or axillary, etc.

Certainly *P. humilis*, *P. glauca*, *P. collina*, and *P. spathulata* present some difficulty, but, generally speaking, the first-named can be known by its hairy flower stem, the second by its narrow leaves prominently veined below, and distinct marginal vein. The third can be separated from the fourth by its incurved leaves, *P. linifolia* having flat leaves drying recurved.

Pimelea Treyvaudii, F.v.M., Ewart and Rees, Grey
Rice-flower.

In 1893 the late Mr. H. H. Treyvaud, when in charge of the Cudgewa State School, discovered this plant on the hills, seven miles to the north of the township. Baron von Mueller merely labelled it, and "*Pimelea Treyvaudii*" remained as an MS. name for 20 years.

It was then taken in hand by Professor Ewart, and the description and figure were published in the *Proceedings of the Royal Society of Victoria*, Vol. XXIV, March, 1912.

It would appear that Mr. Treyvaud collected this species only once, and then took only two specimens, one of which he kept, while the other constituted the type which is still in the National Herbarium. I understood from Mr. Treyvaud that he had not been able to find the plant again. With a faint hope of rediscovering it, I set out for Cudgewa from Chiltern last month, but, by mistake, boarded a train on a Monday, a day on which Cudgewa has no train service, so was forced to stay in Tallangatta. Advised by Mr. Perry, the local forest ranger, where I might spend the day most profitably, I followed a bridle-track over a saddle of the range towards Granya, and, near the top, found many specimens of the rare *Pimelea*. Returning by the new road, several miles along the range, I found the plant again in great abundance at about the same altitude. Evidently it is rather widely spread, after all.

As I gathered, on the same range, specimens of *Pultenea polifolia*, only recently recorded for Victoria (Mitta Mitta, S. Clinton), and some plants of a *Grevillea* and a *Brachycome*, both of which appear to be undescribed species, it would seem that the place has not been systematically searched by an experienced collector.

Mr. Perry has since then sent me more advanced specimens of the *Pimelea*, and their state indicates that the flowering time is prolonged. I should not be surprised to find flowers at the end of November. Like most of the *Pimeleas*, this species bears numerous flowers on a common receptacle, as in the family Compositæ, and they bloom from outer to inner, those near the centre appearing last. Associated with this plant was a congener, *P. spathulata*, of the same size and habit, so that one might easily pass them by as being identical; but examination of the involucre at once reveals the difference. The head of *P. spathulata* is surrounded by four broad bracts, shorter than the flowers, while that of *P. Treyvaudii* has an involucre of eight or nine narrow bracts, as long as the flowers. Only three other Victorian species have more than four bracts—*P. octophylla*, *P. phyllioides* and the variety *hypericina* of *P. ligustrina*.

Pimelea spathulata, Labill. Spoon Rice-flower.

During the same trip to the N.E. it was my good fortune to see a wonderful display of the blooms of this Rice-flower. I would scarcely have believed that a species of *Pimelea* could make such a show, though I know that the Western Australian species, *P. suaveolens*, *P. spectabilis*,

P. rosea and *P. Luehmannii*, can surpass any of those found in Victoria for size and beauty of individual blooms. The chain of low hills extending from Glenrowan for twenty miles north towards the Murray River, and in the northern half running parallel to the Owens River, is known as the Warby Range. The range has been noted in its association with bushrangers, for at Peechelba, nearby, Morgan was shot; and later, at Glenrowan, near the southern point, a hill named Morgan's Look-out, the Kelly gang met its Waterloo.

Ascending the rocky side of the range near Peechelba, and lamenting the unfavourable aspect brought about by sheep, rabbits and fires, I was agreeably surprised on reaching the summit, to find the large shrubby form of *P. spathulata* thickly clothing the hillside and ridge. There was a wealth of white blossom, such as I had never seen displayed on any other Victorian plant. Acres were covered with bushes, three or four feet high, each being a mass of bloom. Besides these, and a few fierce and gloomy-looking bushes of *Acacia triptera*, there were no other flowers.

Pimelea ligustrina, Labill. Tall Rice-flower.

This species, which, like the last-named shrub, is widespread through the State, has large leaves, and its heads of flowers are surrounded by four broad bracts—except in the case of the variety *hypericina*, mentioned above. It is the finest of our Victorian species, and is one of the features of the journey along the Great Ocean Road, from Beech Forest to Moonlight Head and the Gellibrand River, sharing with Satinwood, *Phebalium squameum*, and Balm Mint-bush, *Prostanthera melissifolia*, pride of place for floral pageantry. It is known locally as "Currajong," a name which can be traced to the aborigines, who applied it to plants with useful tough bark, but the use of which we restrict to a small tree indigenous to the N.E. of the State.

The Purple Iris, *Patersonia longiscapa*, has flourished luxuriantly this season around Frankston, Langwarrin and Mornington. It does not seem to be generally known that the flowering apparatus of this plant works on the "maggazine" principle. If a specimen is kept in water when the flower dies off, others will appear in succession, the number varying according to the stage at which the stem was picked.

—G. Cox.

PLATE VII



(Above) SPOON RICE-FLOWER, *Pimelea spathulata*, Labill.

(Below) BUGLE, *Ajuga australis*, R.R. (1 ft. high)

(Photos by H. B. Williamson)

EXCURSION TO GREENDALE.

The excursionists to Greendale on October 31 were favoured with delightful weather. The party was met at Bacehus Marsh by Dr. Shuter. A detour was made to a point on the road which passes over the shoulder of Mount Blackwood, whence was "wide wandering for the greediest eye." To the north lay the extensive Wombat Forest, reaching from near Gisborne to the vicinity of Daylesford, and broken only by one visible patch of cultivation at Blackwood. To the west, Mount Buninyong was the most notable elevation. As the eye turned south, the Pyke's Creek Reservoir was seen gleaming in the sun a little more than four miles away. Due south the low mass of the Brisbane Ranges, the Anakies, and the You Yangs were picked out. The haze prevented sight of the sea and the city, but the Dandenongs and Mt. Macedon completed the round of prospect.

At Greendale the fine conifers surrounding Dr. Shuter's house were admired. The house, of local sandstone, was built by Dr. Shuter's father about 70 years ago, and the trees presumably were planted at the same time. A *Pinus Canariensis* about 70 feet in height attracted much attention; on the young fruits of this tree, our host told us, Black Cockatoos are fond of feeding, and appear to become quite intoxicated as the result. Another pine, the cluster, *P. pinaster*, was a good specimen of its kind. This tree is grown in the Landes, in the south of France, and provides much of the turpentine in use. There were also several huge specimens of *Cupressus macrocarpa*, the Monterey Cypress, and another rare species of the same genus, *C. thurifera*, also North American. To complete the list were several particularly well-grown specimens of *Pinus radiata*, the Monterey Pine. This species is almost entirely composing the plantations now being made at our State Schools for endowment purposes, yet for the best of those at Greendale, one with a stem diameter of more than four feet, eight shilling has been offered for milling purposes! Olive-backed Orioles, *Oriolus sagittatus*, were noisily active in the topmost branches of the pines.

The forest approaches to within a short distance of the house, and was entered after lunch. It was composed mainly of the Messmate Stringybark, *E. obliqua*, the Common

Peppermint, *E. australiana*, the Swamp Gum, *E. ovata* and the Blue Peppermint, *E. dives*. The last-named was, in some places, very abundant. It was flowering, as is its wont, at its very early growth, and some unusually large trees were noted. A few specimens of the Apple Box, *E. Stuartiana*, and the Yertchuk, *E. Consideriana*, were recognised by Mr. P. R. II. St. John. The Yertchuk was, perhaps, the most interesting item noted during the day. This tree was first discriminated by the late Dr. A. W. Howitt, who referred to it as a broad-leaved form of *E. amygdalina*—his *E. amygdalina* (d)—in his "Eucalypts of Gippsland," *Trans. Roy. Soc. Vict.*, ii, 82-85, and there noted its occurrence from near Wallhalla to the Delegate River. The late Mr. J. H. Maiden described the species in Part X of his "Critical Revision," and gives its range in New South Wales, as from Gosford, north of Sydney, to Nelligen on the Clyde River, within the coastal districts. Later Mr. St. John recognised it at Eltham, Warrandyte and Lilydale, and Mr. T. S. Hart found it growing near Creswick. It is not abundant at any of these places, and as it provides such good timber, that some fencing at Eltham composed of it is still sound after 34 years, it seems fated to disappear from these localities.

The ground within the forest was very dry, few flowers were in bloom and most of these had passed their best. Nothing unexpected was noticed, and the only species worth mentioning was a form of the very variable Heathy Parrot-pea, *Dillwynia ericifolia*, seen also recently near Steiglitz, in which the ends of the branchlets terminate in sharp spines. Returning to the house through a most picturesque paddock, in which some noble Manna Gums and Red Gums were growing, the party was again provided with refreshments. Dr. and Mrs. Shuter were thanked by Messrs. St. John and F. G. A. Barnard, on behalf of the party, for their gracious hospitality.—C.S.S.

No botanist is more familiar with the flora of the Grampians than Mr. J. W. Audas, F.L.S., and his book, "One of Nature's Wonderlands," recently published, is a pleasant and useful companion for the field naturalist on holiday in those mountains. The volume is illustrated with a coloured frontispiece and a number of half-tone plates from photographs (chiefly of plants). One short chapter is devoted to the zoology of the Grampians. More books of this kind, dealing with special regions, would be welcomed by Victorian nature lovers.

OUR MALLEE SANCTUARY.

The scrub-roller is the Juggernaut of the Mallee, passing over animal life—the “small deer”—as well as breaking down plants. Before its advance birds and animals must retreat, losing both home sites and hunting grounds. Birds suffer most, since many nests, containing eggs or broods, are crushed by the big rollers. Year by year the incult area shrinks, as the wilderness is transformed into wheatfields.

Only the true desert is safe from encroachment—the region of desolation, where great dunes of white or grey sand lift their shoulders like waves uncrested with foam, and held motionless, mysteriously. The Mallee lands of Victoria, wherever wheat will grow, to wheat will be given over, and eventually the native fauna and flora will be homeless, beyond the boundaries of the desert, and areas that are reserved as sanctuary.

Half-a million acres, permanently reserved in natural state, would ensure the survival, in fair numbers, of Mallee plants and animals that should be saved, since many species are unique, or of very special interest to botanist, biologist, and the field naturalist, who desires that no Australian native thing should disappear completely. We can hope for no such generous portion of the Mallee, but, at least, we have, in Wyperfield Park, a “pocket” sanctuary. Between Yapeet and Pine Plains, 25,000 acres has, for some years, been permanently reserved, and recently arrangements were made towards better guardianship of this wild Park. It is, of course, unfenced, and, lacking funds, the committee of management is unable to appoint rangers to patrol Wyperfield. Now grazing rights are to be granted, and the holders will keep watch for raiders—bird trappers, pot-hunters and their kin.

In the past our Mallee Park has been a centre of bird-trapping, while sportsmen have taken toll of ducks within the boundaries in the shooting season. Parties in quest of fledgling parrots and cockatoos were wont to visit Wyperfield, and depart with scores or hundreds of victims—doomed to captivity. One day, on the shore of Lake Brambruk, I saw a bird-trappers’ camp. The owners were absent, but cooped in tins and boxes were many miserable young

birds, including Regent Parrots, or "Smokers," *Polytelis anthopeplus*, and other protected species. The police were informed, but when a trooper reached Brambruk the raiders had gone. It is not easy to "trap" a bird-trapper, who is flouting the game laws.

Wyperfield is the nesting headquarters of Regent Parrots in Victoria, while the Major Mitchell, or Pink Cockatoo, *Cacatua leadbeateri*, by no means a common bird, breeds there too. Other species of parrots more abundant than the Regent are tenants of the Park area. The Lowan, *Leipoa ocellata*, occurs there, too, and perhaps a bird list with 100 names could be compiled for Wyperfield. It is, therefore, a bit of Mallee country well suited for sanctuary, and, while it remains as it is to-day, we should be thankful. May none of its wildness ever wilt, touched by the hand of progress.

Of Wyperfield for botany I am not competent to write, beyond giving an opinion that the area is representative. There are lakes—one of fair size—and, in a year rich in rainfall, the Outlet Creek flows through the Park and fills them, rarely to an overflow; you may see on the tree trunks the tide marks of forgotten flood-seasons. The course of the creek is marked by river-gums. Then there are dead and living eucalypts in the lakes, and on dry land, as a frame about them. The cockatoos and parrots nest in tree-hollows; some veteran gums provide home-sites for nearly a dozen pairs of birds; others for two or three only. In the treeless tracts, and on the Pine-ridges, one notices familiar Mallee wild-flowers. When I was there, on October days, the lure of blossoms was strong enough to divert me for a while from bird observing; bushes were alight with flowers, and of lesser plants there seemed to be a generous variety.

Not a great area, 25,000 acres, for a National Park—one quarter the size of Wilson's Promontory reserve; yet it is a microcosm of the Mallee, and every Victorian naturalist should visit it in spring or early summertime, if possible, and when the lakes are nearly brimming. It's worth the journey from Melbourne just to see Regent Parrots in their nesting haunt. These are noble birds, happily named anew, for Regent surely is a better title than "rock pebbler," or "smoker." The male, in the prime of plumage, flies in sunshine as a golden bird. And in shadow even, with no gleam of illusion, he is beautiful in olive and greenish-yellow, with a tail not really black, but iridescent, and a fine scarlet bill. The female has duller plumage.

Wonga Park we called our Mallee reserve, until we remembered that another area in Victoria has prior right to the musical first word of that title. Rather a pity, for Wyperfield is much less pleasing, and Wonga is the name of an Australian pigeon, whose call notes echo sometimes near the shores of Brambruk—a Park lake and one of the brightest “eyes” of the Mallee. But Wonga or Wyperfield, the sanctuary is ours to have and to hold, in perpetuity, unless foolish council should prevail with some future Government.

We should, I think, all Club members will agree, make the guarding of Wyperfield Park against encroachment our concern—regard it as a natural heritage. It is second only in importance to Wilson’s Promontory, and, were it more accessible, would perhaps receive as many visitors as that familiar place—wild Nature’s own territory, by man almost unmarred.—CHARLES BARRETT.

NOTES ON FUNGUS BEETLES.

A world of insect life is associated with the various forms of Fungi, but I shall mention only some of the fungus beetles that may be found commonly in the vicinity of Melbourne.

The bracket-like Polypori, particularly the large white species that grow upon the Eucalypts, provide homes for many handsome little beetles belonging to the family Erotylidae. Perhaps the commonest of these is *Thallis janthina*, some 3-16 inch in length and of a rich greenish-blue colour. I have, on occasions, seen huge fungi completely riddled by this species, and it is usual to find larvæ, pupæ, and the mature insects in one plant. Another species, of about the same size as *T. janthina*, but differing from it in being dull red-yellow and bluish-black, is *Thallis vinula*. This beetle also is fairly abundant in Polypori. Some larvæ, feeding in a fungus, that I had confined in a large tube left their natural food and attacked the cork, reducing the greater portion of it to dust. Two large species, which are more rarely found, are *Thallis insueta* and *T. melancholica*, the former yellowish-red and black in colour, and the latter, as its name somewhat implies, of a dull blackish hue. In all, seven species of the genus have been met with by me within a 40 miles radius of the city.

The mouldy fungus growths generally found under logs in damp situations frequently yield some delightful little beetles belonging to the family Scaphidæ. These may be readily recognised by their generally oval form, terminating posteriorly in a sharp point. The largest, and best known, is *Scaphidium quadripustulatum*. This species is a little less than 3-16 inch in length, has two black spots on its prothorax, and four lighter-coloured markings on its elytra. Most of the smaller species belong to the genus *Scaphisoma*, some of them being less than 1 m.m. in length, but frequently they are beautifully marked.

The toadstools often shelter several species of weevils and coachhorses, *Staphylinidæ*. Sometimes toadstools are found with the gills almost "alive" with Staphylinids.

One of the largest and finest of the fungus beetles must be looked for in those brown-topped, yellow-fleshed fungi, that are of a slushy nature, and commonly grow beneath pine trees. This beetle is *Onthophagus dunningi*, of the family Scarabidæ. So far as I know, it is the only species of this large dung-eating genus that favours rotten fungus. It is a dumpy beetle of a uniformly shining black colour, and sometimes nearly $\frac{1}{2}$ inch in length. It is readily distinguished by the character of the male, which has the prothorax continued over the mouth parts in the form of a long and strong horn, and the clypeus furnished with a more or less upright, though much smaller, horn. Among other families of beetles rather frequently met with in fungi may be mentioned—Nitidulidæ, Coidæ, and Cryptophagidæ.

Any fungus showing signs of being attacked by insects is worth bringing home to be placed in a covered bottle, for many most interesting forms of life may be easily reared from it.—F. E. WILSON.

"QUERY" PARCELS OF PLANTS.

Any member desiring at any time to ascertain the names of any native plants is invited to send specimens, addressed to the Club at the Royal Society's Hall, when they will be duly determined by one or another of the members more particularly interested, and a list of the names returned. Each specimen must have a number attached, and duplicates, with corresponding numbers, should be retained by the sender.

SOME OCTOBER BIRD NOTES.

The following notes were made in three different localities — Ashburton, Melton, and Mooroolbark — which I visited frequently in October last. Fine, warm weather prevailed during the month, and bird photographers enjoyed numerous opportunities of obtaining good pictures. The subjects also were more varied, for some inland species came south and nested freely around Melbourne.

ASHBURTON.—The Sordid Wood-swallow, *Artamus sordidus*, arrived here much later than in other years. On October 1 a few were seen soaring. These flights generally are made on the birds' arrival, or just prior to their departure in Autumn. For the first time for many years a pair of Gray Thrushes, *Colluricincla harmonica*, succeeded in rearing a brood at Ashburton. On October 1 the nest was found, concealed in a tangle of bushes, and containing three eggs. Ten days later the young were hatched, and by the 24th they had left the nest and were able to fly well. On the 24th a nest of the Tawny Frogmouth, *Podargus strigoides*, was located, on a large horizontal limb of a box tree. Ten days later the two eggs had disappeared, probably they were taken by one of the many parties of boys, who regularly visit this part in quest of eggs. A nest of the Black-and-White Fantail, *Rhipidura molacilloides*, containing the unusual clutch of four eggs, also was robbed. In the topmost branches of a tall box sapling a pair of Crested Shrike-tits, *Falcunculus frontatus*, had just commenced to build a nest on the 15th, and a few days later it appeared to be completed; however, on the 29th, portion of a broken egg-shell was found on the ground beneath the nest-tree. It was evident that during a wind storm the eggs had rolled out of the nest. The birds were not seen near the nest again, and a few days afterwards had moved to the north end of the paddock. Owing to dry conditions in the northern parts of Victoria, several species moved south towards the sea coast. Among birds that arrived in large numbers were White-browed Wood-swallows, *Artamus superciliosus*. A few pairs were first noticed on the 24th, but soon there were hundreds. Immediately on their arrival they commenced to nest. The

coming of these birds caused the Sordid Wood-swallow to go elsewhere; the two species do not appear to like each others' company. A White-shouldered Caterpillar-eater, *Campephaga humeralis*, was seen on the 28th, and on the same day a pair of Rufous Song-larks, *Cinclothrampus rufescens*, took up their abode in the same locality as that "selected" by a pair in 1923.

MELTON.—The dry ridges along the Deep Creek have always been a favourite haunt of a large number of species during this time of the year. The beautiful Yellow-tufted Honeyeater, *Ptilotis auricomis*, predominates, and on one afternoon four nests were found, all placed among Clematis in flower. Efforts to photograph the parent birds at two of the nests containing young proved unsuccessful, as the birds were timid and would not approach within several yards of the camera. On the 11th an Australian Goshawk, *Astur approximans*, could be seen sitting on its nest more than 50 feet from the ground, in a tall Eucalypt. This nest has had many tenants in its time. Once it was used by a Tawny Frogmouth; then a pair of Goshawks reconstructed it. Later, in the same year, a White-fronted Heron, *Notophonyx novaehollandiae*, flattened it out, and laid four eggs. In the following year the Goshawks again rebuilt it, and they have retained ownership since. A few miles down the creek the shrill cries of another Goshawk were heard in some tall timber, but its nest was not located.

Red-backed Parrots, *Psephotus haematonotus*, were often seen in pairs searching for suitable nest hollows. Like most parrots, these birds seldom commence nesting in southern Victoria before October. Another common bird of this part is the Red-tipped Pardalote, *Pardalotus striatus*, whose monotonous note is heard throughout the day. A few pairs nest in small hollows in trees, though a tunnel in a river-bank is their usual nest-site. Many of these burrows are found in the banks of the Deep Creek. Brown Hawks, *Hieracidea berigora*, are numerous still on the open plains between Sunshine and Melton, where, from the train, as many as half a dozen may be seen in different spots.

MOOROOLBARK.—The scrub birds in this locality usually are early breeders, and this year proved no exception, as nests of several species were found to contain young at the beginning of the month. A nest of the White-eared Honeyeater, *Ptilotis leucotis*, was ready for eggs at the end of September. A fortnight later, however, there was only one egg in the nest, which appeared to be deserted, and was

being pulled to pieces by other birds needing material for their own nests. Some years ago Coachwhip birds *Psophodes crepitans*, were fairly numerous in pairs in this district, particularly along the Olinda Creek; but with the clearing of the scrub they have become scarce. The Ground-bird, *Cinclosoma punctatum*, too, is rarely seen now, though a few years ago several pairs were known to exist in certain paddocks.

Early in the month a few Caspian Terns, *Sterna caspia*, and numerous Silver Gulls, *Larus novæ-hollandiæ*, were much in evidence on the Yarra River, but disappeared as the nesting season approached. The Gulls also have vanished, all but a few, that may yet be seen hawking over the Yarra or standing on the bank of the Maribyrnong River at Footscray.—D. DICKISON.

LAND MOLLUSC NEW FOR VICTORIA.

During a recent visit to the Mallacoota district, Mr. Charles Barrett spent some time searching for land shells, but, owing to the continual dry weather, little success was attained—three species alone appearing. However, one of the forms provides an interesting record for Victoria. The shell referred to is *Thersites jervisensis*, Q. and G., sp. From Jervis Bay, N.S.W., this was described as *Helix jervisensis*, by the French naturalists, Quoy and Gaimard, in *The Voyage de l'astrolabe, Zool. Mollusques*, 1832, vol. ii, p. 126, pl. and figs. 18-21. With such well-executed figures, one may readily identify the species. The locating of this mollusc, so far south, is rather an interesting extension to the already wide distribution. The late Dr. J. C. Cox remarks: "There are many varieties of the species. In New South Wales it is almost confined to the eastern watersheds. It first begins about Eden, north of Liverpool Range, and extends all the way up the coast, even to Port Denison, Queensland."

One specimen only of this form was obtained by Mr. Barrett, on a hill-slope near Stony Creek, a tributary of the Genoa River. The dimensions of the shell in mm. are: Length, 18; breadth, 16; height, 14. A useful recognition mark of *T. jervisensis* is the carination on the body-whoil. Hitherto, Victoria has been credited with a poor representation of land mollusca, particularly in the larger forms. The writer is confident, however, that, with a little diligent search, further species await discovery.—C. J. GABRIEL.

THE SPIDER, *ÆCOBIUS NAVUS*.

This little spider, 1-10th of an inch in length, is the only known representative of the family, *Æcobiidæ*, in Australia. Only 15 species have been described, all belonging to the one genus.

Æcobius navus has been recorded from the United States of America, Venezuela, New Caledonia, Japan, Australia, and the islands of the Atlantic. Its wide distribution has been attributed to the agency of commerce. The late W. J. Rainbow recorded it for Sydney—a specimen was collected



ÆCOBIUS NAVUS (Magnified 11. diam.)

on the Australian Museum Building. Dr. R. H. Pulleine, of Adelaide, found a specimen (which I have photographed through the microscope), on a wall of his house, whilst I have collected it on the walls of my own house, opposite the St. Kilda Town Hall. Evidently it is well distributed in Australia.

The fact that this spider is found in houses suggested the generic name—from the Greek *oikobios*—house-dweller. The web can easily escape notice. Measuring about one inch,

it is, as a rule, spun over small depressions on walls or in angles. Beneath it the spider lurks, running away, when disturbed, with remarkable rapidity.

The main characteristic of this family of spiders is the position of the eyes. Unfortunately, the photograph does not show this detail, as there is so little contrast of light and shade at the ocular area, which is placed in the centre of the front half of the body—the cephalothorax. In the majority of species, spiders have their eyes situated well forward on the front portion of the cephalothorax. The only outstanding feature peculiar to this family, which is visible in the photograph, is the shape of the cephalothorax, which is broader than long, instead of being elongated.

Æcobius is a Cribellate spider, possessing the sieve plate spinneret (the cribellum), also the comb (the calamistrum), which can be found on the second last joint of the hind leg. To view this minute detail, one needs a good Canada balsam mount of the specimen and first-class optical equipment, as the calamistrum is but feebly developed.

According to Rainbow, the cocoons of *Æcobius* are flocculent, rather transparent, plano convex, fixed, and each contains seven or eight non-agglutinated eggs.—S. BUTLER.



THE BUGLE IN N.W. VICTORIA.

To those who are familiar with the form of *Ajuga australis*, R.Br., Bugle, which occurs near Melbourne, the form common in the north-west will be scarcely recognisable as the same species. The latter is an elegant plant up to 18 inches in height, well branched, covered with a whitish indumentum, and having long, tubular light-blue flowers. The species as determined by Bentham is very variable. He tells us that he had decided to set up four species till he found, from the examination of a series of 80 specimens from various localities, that he was obliged to refer them all to the single species, *A. australis*, R.Br. Near Haysdale, on the Murray, on a

small rabbit-infested hill, where the only other plants were the introduced pests, Tree Tobacco, Nettles, and Stinkwort, I found a large patch of these beautiful plants. Apparently they are not relished by rabbits.—H. B. WILLIAMSON.

MAGPIES AS PEACEMAKERS.

The White-backed Magpie, *Gymnorhina hypoleuca*, has never been famed as a peacemaker; yet, warlike though he is with human intruders, peace is enforced between bird and bird. On July 21 I noticed two Magpies attacking each other fiercely and persistently. Soon there appeared from every direction more, and still more Magpies, calling to each other as they flew. More than a dozen birds alighted about and between the combatants, one of which rose indignantly while his adversary remained with the newcomers. They, as with deliberate intent, scattered over the grass, and commenced a carol of triumph. First one and then another repeated the same sweet phrase of song, tossing it back and forth, and joining at last in a grand chorus. Meanwhile the Magpie on the wing dropped to earth on the far side of a cyclone wire fence. The second bird hopped through the wire and the fight was resumed. One by one the peacemakers followed through the fence, and again stopped hostilities. This time both the fighters flew, and soon the whole company was lost in the blue.

Exactly one year later, July 31, 1924, I witnessed another frustrated quarrel. The combatants were most determined, and continued their fight in the air, where they were parted again and again by the equally determined peacemakers. At last they flew away, and at once the remaining birds settled in a group of pines nearby and carolled in chorus. On March 18 last still another peacemaking act was witnessed. The cause of the quarrel was visible; a sedate-looking female, which stood aside while each of the two males bent his energies on approaching her and preventing a like action on the part of his rival. The angry birds were parted, and the usual chorus of triumph came from the peacemakers' ranks. Why were two males quarrelling over one female in March?—J. GALBRAITH.

WALLABIES AND ROCK ORCHIDS.

When in East Gippsland recently Mr. V. Miller and I visited a spot far from the track of the tourist, where Rock Orchids, *Dendrobium speciosum*, grow in profusion. Summits

and steep faces of granite creek-cliffs were almost covered in the epiphytes. It was not a floral display, for nearly all the plants had finished flowering, and many were lacking in foliage. Wallabies, our guide stated, had been feeding freely on the "rock lilies." The orchid-rocks apparently are a favourite resort of wallabies, and at one meal the marsupials must do more damage than a "commercial" plant collector. But the Rock Orchids of Stony Creek are not likely to be exterminated, for even agile wallabies may not reach the scores of fine specimens that cling to a wall of granite rising almost sheer from a sloping bank, where the plants are out of reach, both from above and below.—
C. BARRETT.

MORTALITY AMONG STARLINGS.

During the past three years, in the months of August, September and October, I have frequently found as many as six dead starling when walking round my garden. Two of my neighbours have had a similar experience. Although I have sometimes picked up sparrows and blackbirds, I find that the cats eat them with apparent relish, but they will not consume the starlings. With regard to the sparrows, death is accounted for by the presence of poisoned wheat in the gullets, but that does not affect the cat. I have held post mortem examinations on the starlings and failed to trace any apparent cause of death; all the birds were in good condition. On mentioning the matter to an old English farmer, he said: "You should cut out the backbone, as that is very bitter." He informed me that when he was young, hundreds of starlings were killed and eaten by the family after the bitter part of each bird had been removed. Perhaps cats have discovered that the backbone only is unpleasant eating.—G. A. KEARTLAND.

BIOLOGY OF ANTS' GUESTS.

"Fields" almost untilled are not few in the realm of entomology in Australia. One that needs more workers is that of ants' guests—not mere collecting, not descriptions of new species, but the study of behaviour, etc. A distinguished European student of ants and their guests, in a letter to a Melbourne naturalist, says: "There is no doubt that you may do very much for this science in Australia. Many dozens, or, rather, hundreds of species of coleoptera have been col-

lected there already. . . . But nobody has tried hitherto to explore their biology. The relations of these guests to their hosts are nearly unknown yet. . . . You must have constructed for this some artificial nests, where the ants feel quite well, and behave as if they were at home. There have been proposed and built different types of this kind that are all apt for observing the ants and their guests. The most simple of them are called Lubbock nests."

Ornithologists are often apt to ignore conditions of contour soil and plant cover, which are surely determining factors in the occurrence of bird life, when describing the avifauna of any particular locality.

It is, therefore, gratifying to note that a description of the vegetation of the northern end of Younghusband's Peninsula, by Professor J. B. Cleland, accompanies Mr. J. Sutton's interesting account, in the *South Australian Ornithologist* of July last, of the visit of a party to the Coorong.

Firing and grazing have resulted in the destruction of most of the scrub, which once covered the Peninsula, and the shifting sands are likely to overwhelm what remains. The total number of plants present does not probably exceed 100, and is made up of those commonly met with in the coastal belt. The most interesting of those mentioned are *Calostemma*, *Acacia ligulata*, *Kunzea pomifera*, *Melaleuca parviflora*, and *Aster subulatus*.

PHOTOGRAPHS FOR "THE NATURALIST."

It is proposed, while funds permit, to include one plate at least in each issue of the *Naturalist*. Members are invited to submit prints for consideration by the Editor and the Publishing Committee. Unusual subjects are desired, not photographs of scenery, etc. Writers of papers might submit photographs suitable for illustrations.—Editor.

All contributions for the *Naturalist*, and letters to the Editor, should be addressed:

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"Maralena," Maysbury Avenue,
Elsternwick, Vic.

CORRECTION.—Page 184, *Drakaea elastica*; end of second paragraph should read: "so as to simulate anther point."

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EXCURSIONS.

SATURDAY, 12th DECEMBER.—Lilydale. Object: Palaeontology. Leader, Mr. F. Chapman, A.L.S. Meet at Flinders Street Station in time for 1.19 train. Note alteration of time.

XMAS EXCURSION, 26th DECEMBER to 2nd JANUARY.—Wilson's Promontory.

SATURDAY, 16th JANUARY.—Springvale. Object: Grasses. Leader, Mr. P. F. Morris. Meet at Flinders Street Station in time for 1.15 train.

SATURDAY, 30th JANUARY.—Week-end Excursion to Mornington. Object: General. Leader, Rev. G. Cox. Members unable to go for week-end may go by train on Monday morning; train will be met.

SATURDAY, 13th FEBRUARY.—Botanic Gardens. Social afternoon. Meet at office gates at 2 p.m.

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THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 18th JANUARY, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ASSOCIATE MEMBER—	PROPOSER.	SECONDER
Master Oliver Streeton, Fairlie House, South Yarra.	Sir W. Baldwin Spencer.	Mr. J. A. Kershaw.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

By Mr. F. Chapman, A.L.S.—"Flints."

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

NOTE.—Date of meeting changed from January 11 to January 18.

The Victorian Naturalist

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No. 505

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, December 14, 1925. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

LATE MR. J. H. MAIDEN.

The President referred to the death of Mr. J. H. Maiden, who, he said, although not a member of the Club, was well known to many members. He had contributed papers to the meetings, and regularly sent wildflowers to the Club shows. Mr. Coghill proposed that a letter of sympathy from the Club be sent to Mrs. Maiden and family. The motion, seconded by Mr. F. G. A. Barnard, and supported by Mr. H. B. Williamson, was agreed to in silence, members standing.

CORRESPONDENCE.

From. Hon. Sec., Victorian Bush Nursing Association, Sir James Barrett, returning thanks for donation (£55) received from the Club, and inviting the Club to nominate three Life Governors on the Association. Mr. C. Oke, Hon. Sec., said that the Club Committee had considered this matter, and had decided to nominate Miss Hilda Gabriel, Mr. Geo. Coghill and Mr. F. Pitcher. He moved that these three names be forwarded on behalf of the Club; seconded by Mr. C. Daly, and carried unanimously.

REPORTS.

Reports of excursions were given as follows:—Eltham, Mr. W. C. Tonge; Frankston, Mr. H. B. Williamson; Bunyip, Mr. Williamson; Kororoit Creek, Mr. A. E. Rodda; Sherbrooke Gully, Mr. E. E. Pescott; Lilydale, "Ruddocks," Mr. F. Chapman.

A vote of thanks to Messrs. F. Thomas, M.A., and Mr. Holgate for use of cars and hospitality to excursionists to Bunyip was carried unanimously.

GENERAL.

The statement that motor cars were entering the National Park at Sherbrooke, and approaching the falls was discussed

by several members. Mrs. C. Bage moved that the matter be left in the hands of Mr. Barnard and the Secretary, to make, on behalf of the Club, a strong protest to the authorities in charge of the Park against cars having access to the reserve. Seconded by Mr. Williamson, and carried.

PAPERS.

1. By Mr. F. Cudmore.—“A Complete Corallum of the Fossil Coral, *Thamnastræa sera* (Duncan).” The author gave an account of the finding of the Corallum in the fossil-beds at Table Cape, Tasmania, and briefly described this interesting “find.”

2. By Mr. J. A. Ross.—“The Amœbæ and Their Structure.” The author stated that he did not accept the definition of the structure of the Amœbæ, as given in most of the text-books. He thought that they had a defined pellicle, and that the ectoplasm and endoplasm, although not clearly differentiated one from the other, were really distinct parts of the animal, and were not interchangeable. The paper contained an account of numerous experiments and observations, and conclusions arrived at.

Mr. W. Stickland spoke of Mr. Ross's work on the Amœbæ, discussing the points on which he differed from the writers of the text-books.

Mr. Williamson made some remarks on collecting and preserving ferns, and recommended the study of the plants to members who were desirous of doing useful work in the field of botany. He then gave a brief outline of the classification of the ferns, illustrating his remarks with a number of drawings.

EXHIBITS.

By Mr. F. Chapman: Christmas Bush, grown at Balwyn; Fossils from Lilydale, *Romingeria* (coral), *Strophonella englyphoides*.

By Mr. F. Cudmore: Corals, *Plesiastrea urvillei*, from Beaumaris (recent).

By Mr. C. Daley: Native axe from Wongaara, Great Ocean Road; flint core, with chipping edge, from Kennet River, Great Ocean Road; Leaf impressions in shale (Jurassic), from Louise Falls, Grany Creek, Great Ocean Road.

By Mr. J. A. Kershaw: Views of the National Park, Wilson's Promontory.

By Mr. A. E. Rodda: Fruits, leaves and aerial roots of Mangrove, *Avicennia officinalis*, from Kororoit Creek; star-

fish, sea-urchins, *Philine aperta*, with internal shells and gizzard plates, all from Racecourse Beach.

By Mr. H. B. Williamson: Specimens gathered at Bunyip; specimens of ferns, *Hymenophyllaceæ*.

The meeting closed with the usual short conversazione.

EXCURSION TO ELTHAM.

About 20 members visited Eltham on November 14. After walking a mile along the road towards Glen Park the party turned into the paddocks and crossed the creek. The call notes of Rufous Whistlers, *Pachycephalus rufiventris*, Grey Thrushes, *Colluricincla harmonica*, Cuckoo Shrikes, *Graculus melanops*, several species of Honey-eaters and Tit-Warblers, were heard. The first halt was at the recently-made nest of a pair of Olive-backed Orioles, *Oriolus sagittatus*. Several pairs of these birds come from the north every spring, and nest near their old home-sites. The nest examined was on the fork of the swinging bough of a Box sapling near the creek, and contained three eggs. The eggs were hatched on November 16, sixteen days after the last egg was laid.

Two Regent Honey-eaters, *Meliphaga phrygia*—flocks of which have favoured Eltham with their presence for several seasons in succession—were putting the finishing touches to their nest, high overhead, in a fork of a Stringy-bark tree. Not many yards away a pair of Butcher-birds, *Cracticus destructor*, had nested in a sapling. We walked on up among the timber, where the White-winged Choughs, *Corcorax melanorhamphus*, had their mud nests. Working back to the creek, we passed another Orioles' nest, in a swinging sapling; the young birds had recently flown. Close by, on the horizontal branch of a tall White Gum, was the nest of a pair of White-fronted Herons, *Notophoxyx novæ-hollandiæ*. Two young had been reared, the third having fallen on misfortune. This nest has been used for two years in succession, being renovated this season.

Among the timber again, on the gully sidings, we observed a nest in a Stringy-bark containing three fully-fledged young Choughs. They were feeling the heat and were anxious to try their wings; two of them came to the ground. On the fork of a Stringy-bark branch a Tawny Frogmouth, *Podargus strigoides*, and two young ones, nearly fledged, were sitting

motionless. On the way to Eltham Heights, and the leader's house, we inspected the nesting-hole of a pair of Spotted Pardalotes, *Pardalotus punctatus*.

W. C. TONGE.

EXCURSION TO FRANKSTON.

On November 21 about a dozen members travelled by train to Frankston, and were joined there by the Rev. G. Cox and 18 juveniles, members of the Mornington Naturalists' Club. The walk along the railways towards Langwarrin proved interesting. Four species of Guinea-flowers were gathered, but not all in bloom. Four species of Sundew also were found, in the moister places. Both Dianellas and the beautiful Golden Spray were admired. The two Bladderworts and the Tall Yellow-eye were seen, but no orchids were reported to the leader. The feature of the outing was the presence of the juveniles, and their keenness was admirable, considering that they had been out all day. Mr. Cox is to be congratulated on the fine work he is doing at Mornington. He gives up many of his Saturdays and some of his evenings to the young folk, and has instilled into his pupils a love for the things of Nature.

H. B. WILLIAMSON.

EXCURSION TO KOROROIT CREEK.

Owing doubtless to hot weather on November 28, and the claims of another excursion, only three members took part in the outing to Racecourse Beach and Kororait Creek. The tide had receded, and an hour was spent in exploring shallow pools. Many molluses, including a species of *Philine*, were noted. The tracks of such species as the Sea-snail, *Natica*, and the Bubble-shell, *Bulla*, could be followed, and the creatures discovered, slowly progressing. Starfish, sea-urchins, several species of crabs, prawns, and the aggressive sea-lice were observed. Little flounders, coloured exactly like the sandy bottom, sprang from invisibility and sometimes sought shelter beneath our feet. About 20 Sea-curlews, *Numenius cyanopus*, were seen, in a flock, and with them a number of Sandpipers of two species, too distant for certain identification. At the sea-edge were two Black Swans, as well as Silver Gulls, Terns and Cormorants.

Leaving the beach, we crossed the low, marshy flat to the creekside. This flat is covered mainly with large bushes of Samphire or Glasswort, *Salicornia*, and other saline vegetation. The spaces between the bushes were everywhere bridged

by the tough threads of a peculiar "thorny" spider (*Gasteracantha* sp.), present in great numbers. A few nests of the Tang, *Epthianura albifrons*, were found, and several of the birds were seen flitting, in jerky flight, from bush to bush. In the quiet water of the creek a Great Crested Grebe, *Podiceps cristatus*, was swimming and diving. A number of Mangrove trees, *Avicennia officinalis*, still remain on the eastern side of the creek, surrounded by a stubble of upright aerial roots, whose length is governed by the rise of the tide. On the opposite bank a pair of Spurwinged Plover, *Lobibyx nove-hollandiae*, were seen. Other birds noted were Dotterels, Skylarks, Pipits and Goldfinches. A feature of the return journey was the large number of brown butterflies, seeking sheltered nooks in anticipation of the hurricane that burst upon us half an hour later, when we had reached the Seaholme station.

A. E. RODDA.

EXCURSION TO BUNYIP.

On November 28 eight members were met at the Bunyip railway station by Mr. F. Thomas, M.A., and Mr. Holgate, who motored to Mr. Thomas' home, about two miles north of the township. After an inspection of the garden, where the presence of native plants testified to the owner's Australian spirit, the party were driven a mile further north, and then an enjoyable walk westward brought them to the foot of Mt. Cannibal. The ramble led through country where the Short and Long Purple Flags, *Patersonia glauca* and *P. longiscapa*, were found together, and representatives of the Lily family were much in evidence, Pale Grass Lily, *Casia parviflora*, the beautiful Fringe Lily, *Thysanotus tuberosus*, the Tufted Lily, *Stypandra caspitosa*, and the Smooth Flax Lily, *Dianella laevis*. The Swamp and the Spreading Bush Peas, *Pultenaea*, *Weindorferi* and *P. Readeriana*, and the Pale Wedge Pea, *Gompholobium Huegelii*, were also noted. Mt. Cannibal was then ascended. Large flat granite rocks formed a character of the summit. Descending towards Garfield, the Cannibal Creek was reached, where the Broad-leaf Water Milfoil, *Myriophyllum amphibium*, was gathered. This plant has not yet been recorded for the South. On the lower slopes of Mt. Cannibal the peculiar Wiry Spear Grass, *Stipa Muelleri*, was common. It is a tall grass, with rarely more than one spikelet in its flower head. The Eucalypts noted were Swamp Gum, *E. ovata*, Mountain Grey Gum, *E. goniocalyx*, Peppermint

Gum, *E. australiana*, Messmate, *E. obliqua*, and White Stringy Bark, *E. eugenoides*. Seedlings of the last-named were found on the dry hill-top, showing the interesting ligno-tubers well developed.

H. B. WILLIAMSON.

EXCURSION TO SHERBROOKE GULLY.

A party of six took part in the full-day excursion on December 5. Sherbrooke Gully was approached by the hill-road from Tecoma station, whence the magnificent panorama, from Beaconsfield, Westernport to Port Phillip, was viewed. Many birds were observed in the Gully, others were noted by their calls—the Coachwhip Bird, *Psophodes crepitans*, and the Bell Miner, *Manorhina melanophrys*. Flowers were scarce; the chief ones noted being the Clematis and Christmas-bush, *Prostanthera*. Nothing of special note was seen, the day being a quiet one of general observation.

E. E. PEScott.

EXCURSION TO RUDDOCK'S QUARRY, LILYDALE.

Thirteen members and friends visited Ruddock's quarry on the afternoon of December 12; and an hour was spent collecting the Silurian fossils which are here very abundant. The details of a previous excursion (see *Victorian Naturalist*, vol. XXXVIII, p. 122) give a good idea of the richness of this mudstone deposit. On the present occasion we found such corals as the parasitic *Pleurodictyum*, the rambling *Romingeria* and the turbinate *Lindstrœmia*. The lamp-shells comprised the genera *Orthis*, *Strophonella*, *Spirifer*, *Leptaena* and *Nucleospira*. Some interesting bivalves found included *Grammysia* and *Goniophora*. Of the Gasteropods there were *Bel-lerophon*, *Pleurotomaria*, *Murchisonia*, *Lôxonema* and *Carinarropsis*. Portions of the straight nautiloid, *Cycloceras*, represented the cephalopods. Two examples of the ancient goose-barnacle, *Turrilepas*, were found, as a separate plate and some connected ones. And last, but not least, was a free cheek, with attached facettèd eye-lobe, of the trilobite, *Phacops*. The specimens found were named on the spot, and as the leader and Mr. F. A. Cudmore, brought some illustrated papers on the fossils of this particular bed, members could see the actual figures. To several the treasures of this little quarry were a distinct surprise, and the expression of having enjoyed a pleasant afternoon, was unanimous.

F. CHAPMAN.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

Part I.

Ferns have always enjoyed much popularity on account of their decorative value and the attractive appearance they present when pressed and dried. Some people consider that no garden is complete without a fernery, and many householders who cannot have a garden manage to have a pot fernery, where they can tend some of these graceful plants. And what is more restful to the eye on a glaring summer day than to wander among ferns in a shady grove? Besides those who use them for making home beautiful, there are some who delight in seeing them in their natural habitat, studying their wonderful life history and perhaps trying to classify them and learn their names. Especially to these last my notes are designed to appeal.

Of the Victorian ferns very few may not be found within 100 miles of Melbourne, and there is no reason why ferns, as objects for study and collection, should not be as popular as orchids, excepting, perhaps, the fact that the latter are found in all kinds of places, while ferns, as a rule, are restricted to the mountain gullies.

Collections of dried ferns are easily made; all that is required being a supply of newspaper between stout card covers of a convenient size, say 15 inches by 11 inches. Fronds should be placed in the portfolio as soon as picked, and pressure applied by means of two leather straps. On reaching home, the fronds should be placed between dry paper, under a weight of about 30 lbs. A little attention every two or three days is needed to transfer them to dry paper, and to see that the fronds are spread properly.

In gathering ferns, look for fertile fronds, those bearing on their under-surface reddish masses of spores. These are important for the purpose of classification. When quite dry, the ferns may be mounted in albums, or on sheets of stiff paper, either by placing gummed strips across a good many parts of the fronds, or by fastening every portion of them

down on the paper with glue, a method which makes a permanent mount, able to stand much handling. This is the method which I have found efficient for school collections, and am using with the collection of ferns that I am offering to the Field Naturalists' Club for the Library. I shall be glad to give later the details of the method, if it is desired. In mounting ferns, especially if the glueing method is used, it is important that a part, at any rate, of the frond be mounted with the under side uppermost, so that the arrangement of the fruit-masses can be studied.

In dealing with the classification, I do not propose to labour the descriptions, or to use many scientific terms. In the scientific treatment of the classification of plants, one is supposed to start with a key to the families—Natural Orders, we used to call them—and learn the characters of these. Then a key to the genera is to be used, and after that a key to the species in the same way. If I do not follow that method I hope that the sacrifice of scientific principles will be more than compensated for by the value of these notes to the novice. It would be well if Mueller's Key, Part I, were used in conjunction with these notes, and that the drawings at the end of Part II. were at hand for reference. The last 28 pages of the latter are well worth studying.

The following are definitions of some of the terms with which fern students should be familiar:—

Frond, leaf springing from an underground stem (rhizome) or from the summit of an erect trunk.

Pinna, primary division of a frond.

Secondary pinna, division of a pinna. Called a pinnule when the frond is bi-pinnate only.

Pinnule, the ultimate division of a frond or a pinna.

Sorus, pl. sori. Fruit mass or cluster of sporangia.

Sporangium, spore-case; roundish sac or pouch, holding the spores.

Indusium, Involucre, Fruit-cover, Fruit-cup; the membranous lid, cup or border over or around the sorus.

Dorsal, under-surface, away from the edge.

Receptacle, the seat of the sporangia.

The classification of ferns into families and genera is based on the nature of the sporangia, whether stalked or sessile, large or small, and on the nature of the ring, if any

is present; on the disposition of the sori, whether in lines or in roundish masses, terminal, marginal or dorsal; on the presence or absence of an indusium, and on the venation of the pinnules. The structure of the sporangia is interesting, although a hand lens is scarcely capable of revealing the detail; but as the classification sometimes depends on it, it had better receive some attention. It is seen that the sporangium is often surrounded by an annulus (ring) of thickened cells, which forms an elastic organ, which, on drying, contracts, and causes the case to be split open, setting free the ripe spores. This ring may be perfect or incomplete, horizontal, oblique or longitudinal, or absent, as in *Osmundaceæ* and *Ophioglossaceæ*.

The following is a list of the characters of the several families:—

HYMENOPHYLLACEÆ.—Sporangia sessile, placed on a bristle-like axis, in a cup-like indusium on the edge of the frond.

CYATHEACEÆ.—Tree ferns, fronds large, sporangia in roundish masses on the under-surface of the frond; indusium sometimes present.

OSMUNDACEÆ.—Ferns with thick trunks, fronds large; sori without indusium, often covering the dorsal surface of the lower pinnules of the frond.

GLEICHENIACEÆ.—Sori dorsal, sporangia few, 2 to 8 in cluster; fronds dichotomous (forked in twos).

SCHIZÆACEÆ.—Fronds with small terminal pinnules; sporangia sessile, with complete ring at the summit, no indusium.

SALVINACEÆ.—Small, fern-like, floating plants, with sporangia enclosed in sporocarps (capsules).

MARSILEACEÆ.—Marsh plants, with fronds springing from creeping stems; sporangia in hard sporocarps.

OPHIOGLOSSACEÆ.—Young fronds not circinate (rolled inwards at the top), sporangia large, sessile, in two rows, on narrow, fertile fronds; no indusium.

POLYPODIACEÆ.—Sori dorsal or marginal, rarely terminal, usually stalked, some with indusium.

It so happens that the first and second families named in the Census represent the dwarfs and the giants of the fern



Family HYMENOPHYLLACEÆ.

world, members of the first family being no higher than an inch or so, while the second numbers among its members plants over 60 feet high. I shall deal with the dwarfs first.

Family HYMENOPHYLLACEÆ

(Tender- or Delicate-leaved).

This family includes those tiny ferns which, in our fern gullies thickly clothe the trunks of tree ferns. Fallen logs and mossy rocks also may be seen completely covered with their translucent fronds, which have been likened to shiny green silk. Rarely do we see them in ferneries, for the conditions under which they grow are difficult to obtain artificially.

Genus TRICHOMANES.

The name alludes to the bristle-like axis on which the spore-cases are set. This axis rises from the bottom of a cup-like involucre set on the edge of a pinnule.

TRICHOMANES VENOSUM, R.Br. Bristle Fern.—This is very abundant in almost every fern-gully, and is easily known by its simply pinnate fronds, the pinnae of which are forked-veined, and by the fruit-cup being embedded in the pinna (immersed) near the base on the inner side. The cup has a short, spreading border. It occurs in New Zealand and all the States except West Australia and South Australia.

T. HUMILE, G. Forst. Short Bristle Fern.—This tiny plant has rarely been gathered in our State. The only Victorian specimen I have seen was gathered in the Dandenong Ranges in 1876, by Mr. Robt. Lucas. It has recently been reported by Mr. A. J. Tadgell, from Mt. Bogong, and among specimens brought from Mallacoota by Mr. C. Barrett. It differs from the common Bristle Fern in not having any forked veins. The fronds are not simply pinnate, but are doubly pinnatifid (segments not divided right to the mid-rib). The fruit-cup is scarcely embedded in the pinnule, and has no spreading border. It occurs in New South Wales, Asia, Polynesia and New Zealand.

Genus HYMENOPHYLLUM.

In this genus the arrangement of the sporangia is the same as in *Trichomanes*, but the fruit axis is not exerted, and the cup has not an almost entire edge, but is bi-lobed, and sometimes deeply cleft. The lobes are not easily seen, for when the fern is pressed the lobes are pressed together.

HYMENOPHYLLUM TUNBRIDGENSE (L.), Smith. Tunbridge Filmy Fern.—This fern is very widely spread, having been recorded from every continent and every part of Australasia, except West Australia. It is known by its pinnules being finely-toothed, and by having fruit-cups at the base of the pinnules, the lobes of the cup being also finely-toothed.

H. AUSTRALE, Willd. Austral Filmy Fern.—This has fronds 3 inches or 4 inches long, twice or thrice pinnatifid. It has its frond-stalk winged throughout. It occurs in Asia, Polynesia and New Zealand, as well as in all States of Australia, except West Australia and South Australia.

H. FLABELLATUM, Labill. Shining Filmy Fern.—This is known from the preceding by its stalk being filiform throughout, and not winged, and by its pinnae being more fan-shaped. Its distribution is the same, except that it is not recorded from Asia.

H. RARUM, R.Br. Rare Filmy Fern. This fern is not included in the Census, but specimens collected by Mueller at Apollo Bay—no date—prove to be this rare species. I have some doubtful specimens gathered at Lorne in 1922 by Rev. A. C. Gates. It is common in New Zealand and Tasmania, and has been recorded from South Africa and South America. Its fronds are narrow and simply pinnate, the pinnae being 2-5-lobed. If one of the pinnae of *H. australe* were lengthened out and provided with a filiform stalk it could easily be mistaken for *H. rarum*. Its delicate pendent fronds, on capillary stalks, may be looked for on fern trunks in the Otway Ranges.

Family CYATHEACEÆ.

Genus DICKSONIA.

In Victoria all the six species which develop tall trunks belong to the family Cyatheaceæ. The genus *Dicksonia* is distinguished by having sori roundish, marginal, and surrounded by an indusium, formed partly by the incurved margin of the frond, and partly by an inner membranous valve.

D. ANTARCTICA, Labill. Soft Tree-fern.—This is our great tree-fern, reaching to a height of 30 to 50 feet, and with a trunk of several feet in diameter, including a mass of matted rootlets. This elegant fern, together with the species next to be mentioned, impresses upon our shaded forest glades a



Family CYATHEACEÆ (I—V); Family OSMUNDACEÆ (VI).

tropical grandeur and grace of foliage which Eucalypts cannot give, but the tall gum trees play their part in forming and preserving the fern gullies by providing shade and conserving moisture, and it is only in the country of the giant gums that tree-ferns flourish and support their dwarf allies.

Genus *ALSOPHILA* (grove-loving).

This genus is easily known by the round fruit-masses, set well away from the edge of the pinnule, and by the absence of an indusium.

ALSOPHILA AUSTRALIS, R.Br. Rough Tree-fern.—This is the only other tree-fern common in Victoria. It is not quite so robust, but is generally taller than the *Dicksonia*, and is often seen on hillsides where there is a very good rainfall. Along the Gippsland railways one may see specimens of this fern up to 30 feet or 40 feet growing among the potato crops, but I am not optimistic as to the long continuance of the species if deprived of its natural shelter by the settlers of the forests.

A. REBECCAE, F.v.M. Wig Tree-fern.—Recently a specimen of this fern, collected by Mr. Sayer some years ago at the Bemm River, East Gippsland, was found in the National Herbarium. It had been determined by the late Prince Bonaparte. It is very distinct from its congeners, having its secondary pinnae undivided, simply serrate. As this fern is a Queensland species, and has not been found in New South Wales, the re-discovery of it at Bemm River will be looked forward to with interest.

A. COOPERI, F.v.M.—A specimen collected near Cape Otway (C. Walter) was determined as *A. Cooperi*. This species was assigned by Domin to a variety of *A. excelsa*, which approaches *A. australis* very closely in foliage, but is easily distinguished by its stem. I consider that a determination of this species on an examination of a small frond segment cannot be accepted, so that the addition to the *Census* is in error. I may say that Mr. Morris, of the Herbarium, agrees with me in this.

Genus *CYATHEA*.

In this genus the sori are round, and set away from the edge of the frond, as in *Alsophila*, but they are provided with a cup-shaped indusium, which, in the young stage, is almost closed, and later bursts open, and leaves a cup or complete ring round the sorus.

CYATHEA CUNNINGHAMII, F.V.M. Slender Tree-fern.—This fern is remarkable for its slender stem, which is sometimes 40 feet high and only $3\frac{1}{2}$ inches in diameter. It is common in New Zealand and Tasmania, but it has not often been gathered in our State. In 1883 Mr. John Baldey sent fronds to the Herbarium from “a creek that rises in Arthur’s Seat, and flows into the sea near Cape Schank.” He described it as having a stem about 4 feet high and 2 inches in diameter, clothed to within a few inches of the ground with the persistent dead fronds. In 1903 I noticed a few on the roadside near Mt. Sabine. They were about 35 feet in height, and not more than 4 inches in diameter. Settlers called it Maori Fern. When first sent in by Mr. David Boyle, in 1879, from the Eastern part of the Dandenong Ranges, Baron von Mueller named it *Cyathea Boylei*, but afterwards identified it with the species he had described in the *Southern Science Record* as *C. Cunninghamii*.

Mr. P. R. St. John informs me that 30 years ago specimens of this fern from the Dandenong Ranges were sold in the Melbourne streets as the rare *Cyathea Boylei*; one explanation of its rare occurrence now in that district.

C. MEDULLARIS (Forst.), Sw. Black Tree-fern.—This is one of the kings of the fern family, reaching, in New Zealand, a height of over 60 ft. It is more robust, with larger and coarser fronds, and a thicker, black stem. The fronds are often seen extending over 36 feet—truly a “monarch of the grove.” It may be known by the shiny black bases of the front stalks persistent at the summit of the stem. It is found in Tasmania, New South Wales, Asia, Polynesia and New Zealand. A few specimens have been seen in the Otway Ranges.

Family OSMUNDACEÆ.

Genus *TODEA*.

TODEA BARBARA (L.), Moore. King Fern.—Although not counted among tree-ferns, since it does not produce a tall trunk, yet it is one of the giants of the fern gullies, for what it loses in height it makes up in breadth, the stem often exceeding 4 feet in diameter. Colossal specimens, weighing over a ton, without the fronds, which were very large, and numbered over a hundred, have been seen in the Gembrook Ranges. The plant belongs to a small family, which is distinguished by its sporangia having no ring. Its fronds are of a tough and firm texture, and the sori are crowded on the

forked veins of the lower segments of the lower pinnae, sometimes covering the whole of the lower surface of the segment. It is distributed through South Africa, South-east Australia and New Zealand.

EXPLANATION OF ILLUSTRATIONS.

Family HYMENOPHYLLACEÆ.

- Fig. I.—*Trichomanes venosum*, frond and fruit cup.; (a) sporangium of *Trichomanes* and *Hymenophyllum*.
 Fig. II.—*T. humile* and fruit cup.
 Fig. III.—*Hymenophyllum tunbridgense*, and fruit cup.
 Fig. IV.—*H. rarum* and fruit cup.
 Fig. V.—*H. flabellatum* and fruit cup.
 Fig. VI.—*H. australe* and fruit cup.

Family CYATHEACEÆ.

- Fig. I.—*Dicksonia antarctica*; (a) pinna; (b) pinnule; (c) indusium showing sporangia; (d) sporangium.
 Fig. II.—*Alsophila australis*; (a) pinna; (b) pinnule enlarged; (c) pinnule showing a serrate form; (d) sorus; (e) side view of same; (f) sporangium of *Alsophila*.
 Fig. III.—*A. Rebeccae*; (a) pinna; (b) enlarged portion.
 Fig. IV.—*Cyathea Cunninghamii*; (a) pinna; (b) enlarged portion; (c) side view of sorus of *Cyathea*.
 Fig. V.—*C. medullaris*; (a) pinna; (b) sporangium of *Cyathea*.

Family OSMUNDACEÆ.

- Fig. VI.—*Todea barbara*; (a) portion of pinna; (b) portion of pinnule enlarged; (c) sporangia.

A NOTE ON PHILINE.

The mollusc *Philine* was found in numbers on the submerged sand at the Racecourse Beach, near Seaholme, on the occasion of the Club excursion on November 28. The description given by S. P. Woodward in his "*Manual of the Mollusca*" of the type species, *Philine aperta*, applies very closely to the subject of this note. It reads as follows:—"Shell internal, white, translucent, oval, slightly convoluted, spire rudimentary. Animal pale, slug-like, mantle investing shell. Head oblong, eyeless, foot broad, lateral lobes large but not enveloping. Gizzard with three longitudinal shelly plates." The movements of this creature are so slow as to be almost imperceptible. Held in the hand it appears to be inanimate, but after a while is seen to have changed its form, becoming less flattened. It is very conspicuous on the sand, and must be distasteful to birds and fish, otherwise it could not exist so plentifully.—A. E. RODDA.

THE FOSSIL EUCALYPTUS RECORD

BY FREDK. CHAPMAN, A.L.S.

Although J. H. Maiden, in his "Critical Revision of the Genus *Eucalyptus*" (see vol. VI, part 5, 1922, p. 244), makes no claim to be a palaeobotanist, yet his great knowledge of the genus *Eucalyptus* gives a distinct value to his opinion on the much-discussed question as to the occurrence of that genus in fossil deposits elsewhere than in Australia. Those who are interested in Australian Tertiary palaeobotany will find it an advantage to read and weigh Maiden's critical remarks on the foreign records of *Eucalyptus*, which will be found in the part of his work quoted above. Furthermore, the summary of recorded Australian fossil species, by Ettingshausen and Deane, are there presented in an extremely handy form, and Maiden has spared no pains to make his quotations complete to the date of publication (see Crit. Rev., vol. VI, part 1).

Regarding Ettingshausen's reference to his species of the Queensland and New South Wales fossil Eucalypts as of Cretaceous age, Maiden quotes the arguments given by Henry Deane, and later by the writer (in this Journal, 1921), from the standpoint that the type of venation indicates a much later and fairly modern origin, and could hardly have been evolved during the earliest stages in the appearance of the dicotyledonous floras.

Of the three species of the supposed North American fossil Eucalypti, Maiden is in agreement with Professor E. W. Berry, of Baltimore, who says:—"Among the numerous Cretaceous fossils from North America now referred to *Eucalyptus*, there is not a single one that does not show characteristic features of *Eugenia* or *Myrcia*, especially of the latter, a fact greatly impressed on me in handling a large amount of recent material during my study of the American "tertiary forms." As regards the reference to what Maiden terms "the very American genus *Myrcia*," the latter rightly exercises some caution. As far as present distribution indicates, *Eugenia* is the more universally dispersed, being found in Asia, India, Australia, the East Indies, and in Central

and South America; and in this respect Berry's reference to the genus as a fossil form will be of interest to future workers.

In Part LV of Maiden's "Critical Revision," there has been brought together for the first time practically all the information about the supposed occurrence of the fossil species of *Eucalyptus* in extra-Australian localities. Added to this there is the great advantage of the excellent reproductions of figures of the leaves and fruits given by previous authors, such as Heer, Ettingshausen, Saporta, Lesquereux, Newberry and Hollick. In the explanation to the plates, Maiden has given his own notes succinctly, but none the less valuable. As, for example, under *E. Geinitzi*, Heer, pl. XLV, figs. 4-9, and pl. XLVI, fig. d.—"are certainly not representatives of *Eucalyptus* fruits;" whilst we note that authorities like Saporta and Newberry have referred Heer's *Eucalyptus* fruits to those of a conifer.

Coming so suddenly after the death of our friend and fellow worker, Mr. Henry Deane, M.A., the loss of Mr. Maiden is the more severe, since both were indefatigable investigators in the botanical world, and their places will be hard to fill.

The following is a complete list of the Australian fossil Eucalypts, of which the description of the original authors is quoted by Maiden in his "Critical Revision;" besides which he gives reproductions of the original figures. For the age of the beds the present writer is responsible:—

- Eucalyptus Pluti*, McCoy. Deep Leads, Daylesford, Victoria. Pliocene.
E. Kayseri, Johnston. Mount Bischoff, Tasmania. Pliocene.
E. Milligani, Johnston. Macquarie Harbour, Tasmania. Pliocene.
E. Delftii, Ettingshausen. Dalton, New South Wales. Miocene.
E. Diemenii, Ettingshausen. Emmaville, New South Wales and Arcona, Central Australia. Miocene.
E. Hayi, Ettingshausen. Emmaville, New South Wales. Miocene.
E. Houtmanni, Ettingshausen. Emmaville, New South Wales. Berwick, Victoria. Miocene.
E. Mitchellii, Ettingshausen. Emmaville, New South Wales. Elizabeth River, Central Australia. Berwick, Victoria. Miocene.

- E. cretacea*, Ettingshausen. Darra and Oxley, Queensland. Miocene.
- E. Davidsoni*, Ettingshausen. Oxley, Queensland. Miocene.
- E. Oxleyana*, Ettingshausen. Oxley, Queensland. Miocene.
- E. scoliophylla*, Ettingshausen. Oxley and Darra, Queensland. Miocene.
- E. Warraghiana*, Ettingshausen. Darra, Queensland. Miocene.
- E. precoriacea*, Deane. Mornington, Victoria. Miocene.
- E. Hermani*, Deane. Berwick, Victoria. Miocene.
- E. Howitti*, Deane. Berwick, Victoria. Miocene.
- E. Kitsoni*, Deane. Berwick, Victoria. Narracan, Victoria (F.C.). Miocene.
- E. Suttoni*, Deane (olim *Muelleri*, Deane non Moore). Berwick, Victoria. Miocene.
- E. Woolsii*, Deane (re-named *E. Chapmani*, Deane, for supposed pre-occupation by *E. Woolsiana*, Baker). Berwick, Victoria. Miocene.

Maiden refers to provisional determinations of fossil Eucalypts from Australia as follows:—

- E. obliqua*, L'Herit. McCoy, in Prog. Rep. Geol. Surv. Vict., vol. 1, 1873. (This form appears to have been afterwards named by McCoy as *E. Pluti*.—F.C.). From Malmsbury and Daylesford. Leaves in clay, intercalated with lava or overlain by Newer Volcanic. Probably Pleistocene (F.C.).
- E. amygdalina*, Labill. Leaves recorded by Chapman as probably Miocene. From the Ironstone of Redruth, Casterton; coll. by the Geol. Surv., Vict.
- E. melliodora*, A. Cunn. Silicified wood, described by Chapman. Bruthen, Victoria. Miocene or Pliocene.
- E. piperita*, Sm. Silicified wood, described by F.C. Mallacoota Inlet, Gippsland. Miocene or Pliocene.
- Eucalyptus* sp. Leaves in volcanic tuff, Warrnambool, Victoria. Late Pleistocene.

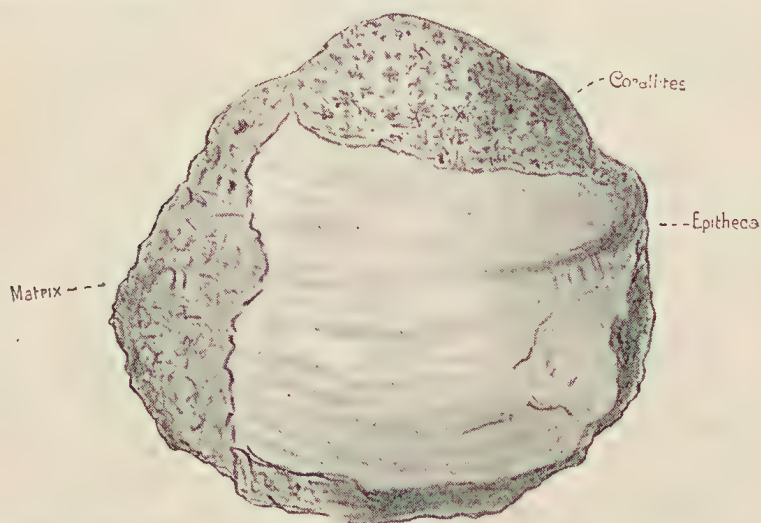
Great numbers of the Goose-neck Barnacle (*Lepas*), of small size, are to be found along the beaches about Mornington, attached to pieces of sponge, cuttlefish, wood, and all kinds of debris. These I have not noticed in this locality, previously, though the common Rock Barnacle (*Balanus*) abounds.—G. Cox.

A COMPLETE CORALLUM OF *THAMNASTRAEA SERA*, DUNCAN

By F. A. CUDMORE.

(Read before the Field Naturalists' Club of Victoria,
December 14, 1925.)

The importance of the present specimen of the fossil coral, *Thamnastraea sera*, Duncan, which is a true reef-building coral, lies in the fact that it is a complete corallum, whereas all the previously-recorded specimens appear to be fragments. It is of considerable interest to note in this example the character of the epitheca, or outer limy covering of the coral, which appears to be quite lacking in specimens hitherto found.



Nearly Complete Corallum of *Thamnastraea sera*, Duncan.
F.C. fecit. Circ. $\frac{1}{2}$ nat. size.

The corallum, which measures $9\frac{1}{2} \times 8\frac{1}{2}$ inches in diameter by $6\frac{1}{2}$ inches in height, presents a dome-shaped appearance, the apical portion being slightly oblique. The more or less broader or flattened side of the corallum shows the best preserved surface of the epitheca. Near the apex this epitheca is abraded, and the ordinary appearance of the septation of

the corallites, as in those figured by Duncan, is clearly seen (1). The largest diameter of the corallites seen on the apical portion average about 15 mm.

The epitheca is fairly thick, and shows more or less wavy and concentric rugæ. Under a lens the epithecal surface is seen to be finely, but distinctly, radially striate, and these striae are crossed by finer concentric lines. The corallum appears to have been bored into by perforating sponges and other boring organisms, while there are indications of attached organisms, including a small oyster and the basal part of three *Vermicularia*.

In 1875 the Rev. Julian Woods sent to Professor P. Martin Duncan a parcel of fossils from Table Cape. Woods had previously pointed out that the strata were of similar age to those of the mainland; and Duncan showed that the fossils received proved that they were from a littoral deposit and that a warmer climate must then have existed in the Table Cape area. Duncan says: "Thamnastraea, so common in the Jurassic ages, was then a reef-builder and a littoral form, and after a great number of species had been evolved, it became rare in the Nummulitic period, and died out in the subsequent geological age in the Australian region, having been probably destroyed in the European areas by the changes which ensued upon the destruction of the Eocene reefs."

About a score of different species of corals are known from the Table Cape beds. The coral-isotherm of 74 degrees passes 15 degrees too far north to allow the reef-building corals to flourish in Bass Straits. Although the region is not a coral reef area at the present day there is an interesting remnant of the coral reef fauna still existing, as shown by the quite large masses of the Astræan coral, *Plesiastrea urvillei*, Ed. et Haime, which occur, at all events, on the Victorian and South Australian coasts. Thus Howchin has recorded a block 7 feet long, 4½ feet wide and 3 feet thick; this was found in the Gulf of St. Vincent, in the course of constructing a break-water at Glenelg, on a sandy bottom 13 feet below low-water level. Some portions of the corallum were still alive, but the main mass was dead.

Occurrence: Basal portion of Crassatellites Bed, Table Cape, Tasmania. Janjukian (Miocene) age. Now in the Wall Case, National Museum; collected and presented by F. A. Cudmore. Reg. No., 13153.

- (1)—"On Some Fossil Reef-building Corals from the Tertiary Deposits of Tasmania," Quarterly Journal of Geological Society, Vol. xxxii, Pt. 3, No. 127, 1876; with plates.



FROGS IN A FERNERY.

Nearly a dozen frogs are at home in my shade-house, and earn their lodging as enemies of slugs and "slaters," caterpillars, and other pests among the ferns. Several of my pets are Golden Bell-frogs, *Hyla aurea*, one of the handsomest of all known species; others are Common Brown Tree-frogs, *H. ewingii*. The latter are the most confiding; but three of the green and golden frogs, domiciled in the fernery about a year ago, are so tame now that they rarely attempt to jump when touched or taken in the hand. Recent arrivals are wary. The early inhabitants have favourite spots, where they rest during the daytime—their hunting is done after dark. A hanging basket is the "habitat" of one Brown Tree-frog. It is seen there every day, with green fronds all about it. *H. aurea* is said to include small frogs in its dietary, but, so far, none of the examples in my shade-house has eaten a diminutive neighbour. Tree-frogs especially make interesting pets, and some of the Australian species are dainty and beautiful.—C. BARRETT.

THE PACIFIC GULL.

A bird familiar in Port Phillip Bay, the Pacific Gull, *Gabianus pacificus*, until recently was lacking from the collection of the American Museum of Natural History. A specimen has now been presented to the Museum by the New York Zoological Society, in whose gardens, for a time, it was exhibited alive. The acquisition is recorded in "Natural History" (Vol. XXV, No. 5, Sept.-Oct., 1925), the journal of the American Museum, and it is stated that the species is represented by only six or seven adult specimens in all the museums of the United States and Canada. Pacific Gulls, both immature birds in the dark, mottled-brown plumage, and adult examples, may often be observed from our Bay

beaches; but they are not confiding, like the Silver Gulls, *Larus novæ-hollandiæ*, which will come within a yard or two of picnickers, lured by scraps of food. There is but one species of the genus *Gabianus*, and it ranges along the eastern and south-western coasts of Australia. I have found it nesting on islets and the larger islands of Bass Strait. On Cat Island it is an unwelcome neighbour of the Gannets, since it raids the great rookery there, taking both eggs and nestlings of *Sula serrator*.—C. BARRETT.

EXPORT OF AUSTRALIAN BIRDS.

Agriculturists overseas naturally are anxious to obtain Australian parrots and other birds for their aviaries, but it should be our aim to have export of all but the most abundant species completely prohibited. Even the common forms need some measure of protection, for they may decline, as the graceful and exquisitely-coloured grass-parrakeets have done, until they approach the boundary of extinction. We cannot spare a specimen of any of our rarer parrots, even for Zoological Gardens in Europe or America, countries to which so many have been sent in the past. The enrichment of private and public collections overseas impoverishes us. Why should we lose our splendid birds, when it is possible to keep them in their native land?

In the new Check-list, compiled by a committee of the Royal Australasian Ornithologists' Union, and to be published shortly, there are unpleasant lines to read—they foretell the fate of several of our most interesting and beautiful species. The Paradise Parrot, *Psephotus pulcherrimus*, of Queensland, is "approaching extinction;" the Turquoise Parrot, *Neophema pulchella*, is "extremely rare;" and the Scarlet-chested Parrot *Neophema splendida*, "very rare." Formerly one of these doomed species, the Turquoise Parrot, was fairly common in certain Gippsland districts, including Berwick. It has not been observed in any part of Victoria for many years—at least I can find no record of it.

High prices for some Australian birds prevail in England. The following figures are quoted from a dealer's list, published in November, 1925:—King Parrots, £8 each; Rosellas, £2/10/- each; Pennant's (Crimson) Parrots, £3/10/- each; Galahs, £2/10/- each; Leadbeater (Major Mitchell) Cockatoos,

£6 each. An example of any of the rare species, such as the Turquoise Parrot, doubtless would realise in London, or New York, £25, or more.

C. BARRETT.

BELL-MINERS AND CUCKOO.

We have been interested in a pair of Bell-miners, *Manorhina melanophrys*, that reared a Fantail Cuckoo, *Cacomantis flabelliformis*. One day nine Bell-miners chased the fledgeling from a tree, and when it flew to another, the foster parents fed it. I was attracted, on December 11, by a great chattering in one of the chicken-yards and hastened to the rescue of what proved to be the young Cuckoo, now in adult plumage, and somewhat the worse of the treatment it had received at the bills of the numerous Bell-miners. The latter birds scarcely minded me, even attacking the Cuckoo while it was in my hands, flying from over my head, where they were perched, in a peppermint tree. The attack lasted for some minutes. I counted 40 Bell-miners, and there were as many more on the other side of the tree. Each time I called they desisted for a moment only; at last their attention was transferred to a Laughing Kookaburra, *Dacelo gigas*.—C. C. CURRIE.

PHOTOGRAPHS FOR "THE NATURALIST."

It is proposed, while funds permit, to include one plate at least in each issue of the *Naturalist*. Members are invited to submit prints for consideration by the Editor and the Publishing Committee. Unusual subjects are desired, not photographs of scenery, etc. Writers of papers might submit photographs suitable for illustrations.—Editor.

All contributions for the *Naturalist*, and letters to the Editor, should be addressed:

CHARLES BARRETT,

"Maralena," Maysbury Avenue,

Elsternwick, Vic.

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EXCURSIONS.

SATURDAY, 16th JANUARY.—Springvale. Object: Grasses.
Leader, Mr. P. F. Morris. Meet at Flinders Street Station
in time for 1.15 train.

FOUNDATION DAY WEEK-END EXCURSION TO MORNINGTON.—Saturday. Train, 9.20 a.m.; return ticket to Mornington; detrain at Moorooduc. Afternoon, train 1.47; travel right through to Mornington. Morning party join afternoon train at Moorooduc. **Saturday Evening—**Conversazione at Mornington. **Sunday Afternoon—**Trip to be arranged. **Monday.** Trains at 6.30 a.m. and 9.20 a.m.; both will be met, and party conducted to rendezvous. Return to Melbourne by evening train. Application must be made at once to Rev. G. Cox, Box 10, Mornington, by those requiring accommodation.

SATURDAY, 13th FEBRUARY.—Botanic Gardens. Social afternoon. Meet at office gates at 2 p.m.

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 8th FEBRUARY, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ASSOCIATE MEMBER—

PROPOSER.

SECONDER.

Mr. Fred. Barton, junr.
Foster,

Mr. H. B. William-
son.

Mr. C. Oke.

Victoria.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

By Mr. P. C. Morrison, M.Sc.—"Along the Queensland Coast—A Biological Tour." (Illustrated by lantern slides.)

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

VOL. XLII—No. 10.

FEBRUARY 5, 1926.

No. 506

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, January 18, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about 50 members and friends were present.

REPORTS.

National Park, Wilson's Promontory.—The report given by the leader, Mr. C. Daley, appears elsewhere in this issue.

Spring Vale, Jan. 16.—After the leader had read a short paper on the economic importance of grasses, the party, ten in number, proceeded along the railway line towards the Springvale Cemetery, then across grazing paddocks to the Dandenong line. In the railway enclosure Kangaroo Grass and Wallaby Grass were very plentiful, but in the paddock scarcely a plant of these was seen, stock being very fond of them. About 10 native and 20 introduced grasses were found—P. F. MORRIS.

ELECTION OF MEMBER.

On a ballot being taken, Master Oliver Streeton, Fairlie House, South Yarra, was duly declared elected as an associate member.

GENERAL.

Mr. H. B. Williamson submitted proposals for obtaining permits for collecting ferns from reserved areas for herbarium purposes. Some discussion followed, in which Messrs. Hardy and Pitcher joined. The matter was left for future discussion.

Miss Nokes drew attention to the fact that the Mount Dandenong Progress Association was trying to obtain an area of about five acres on the top of Mount Everard for permanent reservation, and asked for the assistance of the Club. After some discussion had taken place, Miss Nokes

was asked to write to the Association for further information.

Mr. H. B. Williamson read a newspaper clipping advocating the reservation of Sperm Whale Head as a sanctuary for Eastern Gippsland. The chairman invited Mr. F. Barton, of Foster, to speak on the subject, and give further information in regard to the site, and as to what had already been done in the matter. This he kindly did, and, after some discussion, the matter was referred to the Committee, on the motion of Messrs. Hardy and Williamson.

PAPER.

“Flints and Their Origin,” by Mr. F. Chapman, A.L.S. In the paper the author gave a brief and popular account of the formation and occurrence of flints in Europe and Australia, and the various uses to which they have been put. Several members joined in the discussion that followed.

The meeting closed with the usual short conversazione.

EXHIBITS.

By Miss Bolton: *Clematis microphylla*, grown at Canterbury.

By Mr. F. Chapman, A.L.S.: Flints in illustration of his paper. (1) Cone structure in flint, from Isle of Wight. (2) Fractured Miocene flints, Over Bird Rock, Torquay, Victoria. (3) Chat, with sponge remains, Upper Greensand, St. Lawrence, Isle of Wight. (4) Flint (Cretaceous), with molluscan remains, Watford, Herts, England. (5) Water-worn flints from Terrace Gravel. Foundations of the Victoria and Albert Museum, South Kensington, London. With enclosed Sea-urchin. (6) Sea-urchin (*Anachytes*), from the Chalk. (7) Sea-urchin of the same genus in Flint, England. (8) An Upper Chalk Flint, with Polyzoa (*Heteropora*), Margate, Kent, England. (9) Tertiary (Miocene) Flint, Flinders, Victoria. (10) Rose-coloured Flint, from the Chalk of Swanage Bay, Studland Dorset, England.

By Mr. C. Daly, B.A., F.L.S.: Series of Flint Cores, with cutting points and Flint chips from Kitchen-middens along Victorian coast. Also a very robust specimen of the Trigger plant, *Styidium graminifolium*, from Sealers' Cove.

By Mr. L. Hodgson: Herbarium specimens of *Helichrysum semi-papposum*, *Pimelea ligustrina*, *Gynopogon buxifolius*, *Calocephalus Brownii*, *Hedycarya angustifolia* and

Veronica derwentia, from Lorne district. Collected January, 1926.

By Mr. P. C. Morrison, M.Sc.: (1) Two specimens of the Crustacean *Thalassina Anomala*, a transition form between the crayfish (*Macrura*) and the crabs (*Brachyura*), and forming, with the hermit crabs and two rarer groups, the sub-order Anomura. Specimen i was taken alive on a mud-flat near Bowen, North Queensland, where numerous mounds about a foot high bear testimony to its powers of burrowing. Specimen ii was found as a fossil at Bathurst Island, near Port Darwin, and, in spite of the damage and distortion, it is seen to be specifically identical with specimen i. (2) A group of young specimens of the solitary coral *Fungia*, which grows from a stalk, breaking off and becoming free-living when adult. The old stem will give rise to a fresh animal, the marks of two previous individuals being visible on the largest stem. The other two stems are producing each their first individual. Specimen from Stone Island, Reef, North Queensland. (3) *Periophthalmus*, one of the bony fish, found commonly among the mangrove swamps in the tropics. The eyes are placed on top of the head, giving the animals their popular name of "stargazer." It is a common thing for these fish to emerge from the water and climb the roots of the mangroves by means of their arm-like pectoral fins. They will remain thus in the air for a considerable time, with only their tails in the water, and it is believed that respiration may be carried on partially through this organ. (4) Two small coral blocks from Hayman Island, Great Barrier Reef. *Favia speciosa* is perhaps the most beautiful and delicate of the corals, and is by no means uncommon, while *Cælocerus Mayori* is among the rarer corals. (5) A series of camera studies of the Sooty Tern; *Sterna fuscata*, which comes in thousands every year to Michaelmas Reef, on the Outer Barrier, some distance north of Cairns, to breed. It was impossible to walk across the sand cay without treading on eggs.

By Mr. F. Pitcher: The Erect Clematis, *C. glycinoides*, in flower; and frond of the Common Shield Fern, *Polystichum (Aspidium) aculeatum*, showing one method adopted for reproduction, in various stages of growth of young plants.

By Mr. H. B. Williamson, F.L.S.: Mounted specimens of 24 species of Ferns, the first instalment of a set of the Victorian Ferns to be donated by the exhibitor to the Club.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

PART II.

Family GLEICHENIACEÆ.

Genus GLEICHENIA.

There are four species recorded for Victoria, two of which are known as Coral ferns, and two as Fan ferns. They are all distinguished by the dichotomous branching of the fronds, the small number, 2-8, of spore cases in the sori, and the absence of an indusium.

GLEICHENIA CIRGINATA, Swartz. Coral Fern.—Widespread throughout Australia (ex. W.A.), New Zealand, New Caledonia and Malayan Archipelago. It is found scrambling among undergrowth in a tangled mass, sometimes to 12 feet, with frond pinnules at right angles to the branches, and divided to the midrib into numerous semi-circular segments, about one-eighth inch long. These segments are flat, or have their edges somewhat recurved, and the sori are near the upper inner angle, with three or four spore cases.

G. DICARPA, R.Br. Wiry Coral Fern.—Distribution the same as that of *G. circinata*, except that it is not found in S.A. It has the same habit and general appearance as the last named, but may be distinguished from it by the smaller segments of the pinnules, which are mostly under one-twelfth inch, and have their margins almost closed to the midrib, forming a kind of bag, scarcely any of the under surface of the segment being visible. Two or three spore cases almost fill this space.

G. FLABELLATA, R.Br. Fan Fern, Tas., N.S.W., Q., N.Z., New Caledonia.—The fronds of this fern are fan-shaped, with pinnules slightly toothed, not deeply divided, and not at right angles to the stem, but at about 45 degrees, rarely above an inch long, one-twelfth to one-eighth broad. The spore cases are in groups, mostly of four, along the lower half of the pinnule, away from the margin. Its distribution in Victoria is rather doubtful, for Mueller included with it

specimens which are now accepted as *G. lævigata* (syn. *flagellaris*). Few of the specimens in the National Herbarium are Victorian. Those from Tyers River, Mt. Pleasant Creek and the Grampians are apparently correctly named, and have been confirmed by the late Rev. W. W. Watts. Authentic records of its range are needed, and it is suggested to collectors that specimens thought to be *G. flabellata* should be sent to the Herbarium for verification and district record.

G. LÆVIGATA (Willd.) Hk. Spreading Fan Fern.—Distribution the same as that of *G. flabellata*. This fern differs from the last-named in having larger and broader pinnules, not toothed, and set at right angles to the branches, with their bases dilated. It is often of a glaucous hue, while *G. flabellata* is generally of a bright or a dark green. It is common in the Grampians and the Dandenong Ranges, and the writer has gathered it on roadside cuttings in the highlands of the North-East, and also between Cann River and Genoa.

Family SCHIZÆACEÆ.

Genus SCHIZÆA.

SCHIZÆA FISTULOSA, Labill. Comb Fern, Tas., S.A., N.S.W., N.Z., As., Af., Polynesia.—This peculiar plant, often scarcely recognised as a fern, consists of a single thread-like stem, about 10 inches high, surmounted, when fertile, by a comb-like frond about an inch long, with as many as 20 pinnules, about one-eighth inch long, bearing sori, with from four to eight pairs of spore cases in each. The whole plant is of a reddish colour, and is easily overlooked. It has been gathered at Oakleigh, the Dandenong Ranges, the Grampians and South and East Gippsland.

S. BIFIDA, Willd. Forked Comb Fern. District the same as that of *S. fistulosa*, except that it is not found in S.A.—It is similar to *S. fistulosa*, and often grows in association with it. It can easily be distinguished by its forked stem. The comb-like fronds are shorter, but the pinnules are about three-eighths-inch long and are narrower and fringed with long cilia.

Family SALVINIACEÆ.

Genus AZOLLA.

Included by Bentham under N.O. *Lycopodiaceæ*, but now counted among the ferns. Small floating plants, often covering the surface of lagoons with a red or green carpet. The fronds are branched and the segments are very small, and



Family GLEICHENIACEÆ (I—II—III—IV).

Family SCHIZÆACEÆ (V—VI).

Family SALVINIACEÆ (*Azolla*) (VII—VIII).

unequally, two-lobed. The spore cases are of two kinds, and are in the axils of the main branches.

AZOLLA PINNATA, R.Br. Ferny Azolla, S.A., N.S.W., Q., As., Af.—The floating fronds are regularly pinnate, sometimes twice pinnate, broadly ovate in outline, about an inch long, and provided with numerous rootlets, at first entire and dilated, but when older prettily feathered. It appears to be common in the Goulburn River flats, and may sometimes be seen on the Botanic Gardens Lake. The writer gathered it years ago on a pond in the Burnley Gardens.

A. FILICULOIDES, L., var. *RUBRA* (R.Br.), Diels, Red Azolla, S.A., Tas., N.S.W., Q., N.Z.—This is a much commoner species, and may often be seen thickly massed on the surface of ponds and lagoons. The brick-red appearance of water-holes is due often to this plant. The fronds are not regularly pinnate, but are simply branched, short, and with few rootlets, which are simple, not feathery.

EXPLANATION OF ILLUSTRATIONS.

Fig. I.—*Gleichenia circinata*. (a) Segment enlarged. (b) Spore case of *Gleichenia*.

Fig. II.—*G. dicarpa*. (a) Segment enlarged.

Fig. III.—*G. flabellata*. (a) Pinnule enlarged.

Fig. IV.—*G. lævigata*, (a) Pinnule enlarged.

Fig. V.—*Schizæa fistulosa*.

Fig. VI.—*S. bifida*. (b) Spore case of *Schizæa*.

Fig. VII.—*Azolla pinnata*.

Fig. VIII.—*A. filiculoides*, var. *rubra*.

THE LATE PROF. A. DENDY, D.Sc., F.R.S.—*The Journal of the Quekett Microscopical Club* (London) for November last contains an appreciative obituary notice of the late Professor Dendy, who passed away in London earlier in the year. Dr. Dendy was well known to many of the early members of the Field Naturalists' Club, which he joined in May, 1888, soon after his arrival in Melbourne as assistant to Prof. Baldwin Spencer, the then recently-appointed Professor of Biology at the Melbourne University. He soon took an active interest in the Club, and, after serving several years on the Committee, was elected one of the vice-presidents for 1893-4. In 1894 he was appointed Professor of Biology at Canterbury College, University of New Zealand. In 1903 he received the appointment of Professor of Zoology in the

University of Capetown, whence he returned to London, in 1905, to take up the professorship of Zoology at King's College, University of London, which position he held up to the time of his death. He was one of the visiting members of the British Association for the Advancement of Science to the Melbourne meeting in 1914, when he renewed his acquaintance with many old friends. He contributed several papers to the earlier volumes of the *Naturalist*, mainly on cryptozoic zoology—peripatus, planarian worms, etc. That he lost no time in starting his investigations is seen by the fact that in the number for January, 1889, he described two species of *Peripatus* which he had just found at Warburton. He was joint author, with Mr. A. H. S. Lucas, M.A., first Editor of the *Naturalist*, in the production of that well-known students' text-book, "An Introduction to the Study of Botany," which was designed more especially for Australian students. In later years he devoted considerable attention to sponges, on which he was a voluminous writer, and, at the time of his death, had become a world-wide authority on that group. He was for four years president of the Quekett Microscopical Club, and his death, at the age of 60, is a severe loss to zoological research work.—F.G.A.B.

FLINTS AND THEIR ORIGIN

BY F. CHAPMAN, A.L.S.

Many references may be found in literature to the hardness of flints, in illustration of the lack of charity or miserliness in certain characters. Thus we read of Antony's friend, Enobarbus, addressing Cleopatra:—

"Throw my heart

Against the flint and hardness of my fault;

Which, being dried with grief, will break to powder."

And we also remember that Dickens' Mr. Flintwinch was not a particularly mild-hearted personage, especially when his wife, Affery, had dreams.

Whilst admitting the hardness of flints, there are other minerals that are harder, but none so common; and this may account for the generally popular idea concerning them. For flints have a wide distribution both in Europe and Britain, and are usually found occurring in bands in the chalk of the South of England, as well as in Yorkshire, East Anglia and the North of Ireland. Flint has always been a favourite material, where found, for use in building, the stones often being disposed in patterns. A fine specimen of flint-work still in existence is in the Old Bridewell by St. Andrew's Church, Norwich, dating about A.D. 1400. According to Blomefield this is "esteemed the most curious wall of black flints in all England for its neat work and look, its stones being broken so smooth and joined so well."

Just as a petrified fruit may be encrusted by a layer of hardened rock, so have many of the terms we commonly use been wrapped in a new coat and have lost their original meaning. This name Flint, for example, is merely the Anglo-Saxon for a rock. And this calls to mind its allusion in the town of Flint, by the estuary of the Dee, in North Wales, where Flint Castle stands high upon the rock which was left as a "butte" when the surrounding country was washed away. The Scandinavian word "flinta" is a similar term. Hallaflinta, indeed, is applied by geologists to the intensely tough, cherty rock sometimes used as a touchstone for testing gold. The Greek plinthos, meaning a brick or shaped stone, also shows some kinship to the same word.

Our ancestors were well acquainted with flint in conjunction with the tinder-box, before the days of the lucifer and safety-match; and the flint and steel was a common equipment until the early part of last century. In these days, when Japanese matches fail to do their duty, we may gain consolation by picturing a man of the middle ages who wanted to light his pipe by the tedious tinder-box, flint and steel.

This use of flint reminds us how, some years ago, whilst walking over a ploughed field in Surrey, England, we picked up a squared piece of flint, thinking it to be an ancient palæolith; but we were assured by a well-known ethnologist that it was probably a strike-a-light thrown away by an agricultural labourer.

In the old flint-lock gun, invented in the early part of the 17th Century, there is a flake of flint held in the cock, which

comes down upon the steel cap of the pan containing the priming. These flint flakes were, until recently, still being manufactured for exportation to Africa, and this "knapping" industry flourished until quite lately in the Norfolk village of Brandon. But far older still is the industry of making flint implements by the colithic, palæolithie and neolithie men of Europe. Flint was preferred because of its good workable qualities, homogeneity and hardness, producing, by percussion, a more or less perfect conchoidal fracture. But that leads us into the wide field of ethnology.

And now as to the occurrence of these flints. When nearing the white cliffs of Dover, the "Albion" of the poets, one may notice the bands of black flints which there run almost horizontally at intervals of one to six feet apart. The intervening chalk is very like a modern deep-sea ooze, when seen under the microscope, since it is made up for the most part of the tiny shells of *Globigerina* and the remains of microscopic plants, with a sprinkling of siliceous diatoms and sponge-remains. As the flints themselves contain the same organisms as the surrounding ooze, they must have been formed in the place where they are now found, and the general consensus among geologists and physicists at present is, that the flinty matter in solution, in the form of a "water-glass," has spread along the sea-bed, and where it has been stopped from sinking by the presence of an impervious layer has formed strings of flint nodules.

In England, North America and elsewhere, except in Australia, flints are curiously enough confined to the White Chalk of Cretaceous age. In this land of anomalies, however, although we have rocks of the Chalk age, we do not there find the flints. They occur, strangely enough, in the Miocene Tertiary of South Australia and Victoria.

In a letter sent to "Nature," and published October 4, 1917 (in a symposial discussion on Flints started by Ray Lankester), the present writer offered some conclusions on the Australian aspect of the subject, from which it will be apposite to make the following extract:—

"These cainozoic flints [of South Australia and Victoria] appear to be confined to the Miocene (Janjukian) beds, and are closely associated with the polyzoal limestone, a white, chalky deposit, consisting of polyzoa and foraminifera. The evidence of a microscopic examination of these flints goes to prove that the position held by Prof. G. A. J. Cole, that chalk flints represent a more or less complete replacement of

the chalky ooze, is the only one tenable from the Australian standpoint. The Australian flints are often crowded with the silicified remains of polyzoa, foraminifera, shell fragments and occasional sponge-spicules, the latter merely included as a component of the ooze, and not as selected material. During the formation of the flint the calcareous bodies are frequently dissolved, and only remnants are seen, in some cases, in the flint sections. Another point, in corroboration of Prof. Cole's contention¹ (based on Liesegang's experiments), is the presence of an impervious bed underlying these tertiary flint layers. This was pointed out long ago by Tenison Woods, who stated that well-sinkers in South Australia have observed that a layer of flint is always found immediately above the water-level. The factor of an impermeable layer inducing deposition of diffused silica is an important one, and is strongly supported in those instances where I have had an opportunity of observing it."

From the fact that flints are almost pure chalcedony or cryptocrystalline silica, and without iron impurities, they are valuable for glass making; and the fine flint glass from which cut-glass is manufactured is produced from pulverised flints, carbonate of potash and oxide of lead. The silica of flints, being deposited in the first place as a jelly or colloid, it is not surprising to see it translucent in thin flakes, although in the mass it looks black. The white coating, moreover, which is nearly always found on flints, has really nothing to do with its being formed in a matrix of white, chalky limestone. This whiteness is entirely due to the fine atmospheric powdering, so to speak, of the skin of the flint, and is caused by the homogeneous flint having been broken up into numerous reflecting surfaces in the same way as when a piece of brown bottle glass becomes white when powdered. When flint nodules have been exposed to weathering, and perhaps to alkaline solutions for a very long time, this white coat may extend nearly, or quite, into the centre of the stone. In illustration of this there is the remarkable bed of flint pebbles in the Tertiary sands of the Bournemouth Cliffs, Hampshire; and when these pebbles are split with a blow they not infrequently show the white appearance right to the centre.

On the economic side, flints may be an indication of water supply. Whereas the nodular form of flints seems to be due

¹Cole, G. A. J. "The Rhythmic Deposition of Flint," *Geological Magazine*, 1917, pp. 164-168.

to the gathering of the silica around an organic mass or centre, the tabular flints probably owe their formation to the saturation of a layer immediately above an impervious marl band. In reference to the bands of flint occurring in the polyzal rock of Port Macdonell, Tenison Woods remarks:—"They occur in sheets of very great extent and about two or three inches thick, and are quarried and used as flags."

A similar band of flint, but in Victoria, was struck some years ago in the Mallee whilst boring for water. It was met with at 600 feet, and, owing to the resistance to tools, made the boring too expensive to carry through with the ordinary appliances. Probably, had this flinty layer been pierced, a permanent supply of water might have been tapped; for Tenison Woods has stated, in his "*Geological Observations in South Australia*," that the well-sinkers in South Australia observe that a layer of flints is always found immediately above the water level. This helps to confirm the writer's impression that, as also in the English chalk, an impermeable layer induces the deposition of an overlying band of diffused silica, resulting in the formation of flints.

It is obvious, in this question of the origin of flint, that much light has been thrown on the problem by the Australian data obtained. No well-directed effort of research can be in vain, and, even in the subject we have discussed, the economic aspect has been placed in a clearer light by showing how closely connected is detailed stratigraphical work with artesian water supply.

Like the early European inhabitants of the north, the Australian aborigine had an instinct for discovering flints from which to make his artefacts. At various places along the Otway Coast, and at Cape Liptrap, these flints appear to be washed out of the Tertiary limestones, and there, or in the vicinity, their flakes and worked tools can be found. But since the native was given to barter, these worked flints are generally widely distributed. At Altona Bay, for instance, the small flint knives, made from stone, found as far off as Cape Liptrap, beautifully notched and pointed, may be found in some numbers.

Alas for the romantic side of things! The aborigine takes the path of least resistance, for, as Sir Baldwin Spencer remarks, the black man, associating with the white, drops his time-hallowed custom of using flints and makes his tools of the bottle-glass ready to his hand.



THE LOMATIAS.

The Lomatias, with denticled, holly-like leaves, are close relations of the Waratah, and are among our frequently-met native shrubs. The long-leaved species prefers the river banks, and the other two are quite at home on the drier hill-sides, even the salty air of the seaside not interfering with them. Two of the genus are met with at an altitude of quite 4,000 feet.

Though handsome and worthy of garden culture, I do not notice them in the Honey Flora list. I am disposed to think, however, that before long they will find a place there, although, like some of the Eucalypts, they do not flower equally well each year, and not as they are doing this season. A nine-feet-high *Lomatia Fraseri* growing in my garden is bearing its 100 racemes of flowers.

Busy insects gather round and extract the honey from the quaint, almond-scented, creamy flowers. One warm day I counted as many as 12 different kinds. Some I did not attempt to catch, others I secured for examination. These consisted of a red-headed hymenopterous insect whose abdominal extremity curved while resting; several representatives of the apis family, including a large, brown, hairy fellow with a large X on his back; another, a stubby bee with a greenish-brown head, hardly distinguishable from the rest of his body; a long-bodied, banded dipteran, with surprisingly quick-moving wings, which hovered long and often before deciding to drink. A dark-coloured, black-haired, bee-like insect also extracted its share of the nectar. Even a small common blowfly was seen in company with the common house fly and a small blue fly about the same size. These three last seemed to make things uncomfortable, in preventing from landing a dainty, very small, green-winged ant, whose large wings seemed out of proportion to its body.

These it kept extended both in flight and when at rest. No interference was shown, however, to a busy little black ant, who evidently knew well where the best results were to be obtained.

Mr. C. French, Jr., identified some of my visitors as *Iridomyrmex rufiniger*, *Calliphora villosa*, *Sepsis* sp., *Tephritis* sp., *Musca*, 2 sp., etc.

Last year I thought I had some mature seed saved from this plant, but, on picking the pods, found the contents, as usual, beautifully arranged, but with them an ochrey-yellow substance had formed that I took for a fungoid growth. Mr. D. B. Adam, however, considered it to be acicular crystals of some organic compound, with a brownish layer of distinguished dead tissue cells. Thus, though externally the seed pods looked normal and ripe seeds might be looked for, some form of blight had killed all of them in their many cases.—A.J.T.

NATURAL HISTORY OBSERVATIONS BY NIGHT.

Wishing to see what was happening in the insect world during the hours of darkness, I took the opportunity recently, when on a visit to the mountains in the vicinity of Warburton, to make an investigation. Armed with a powerful acetylene bicycle lamp, I set off along a narrow timber tram line into the heart of the forest. The first things to attract my notice were hosts of small, brown caterpillars, with their heads all turned in the same direction, hurrying along the tram rails. For about 200 yards they could be seen everywhere, and were all making north. The only reason I could assign for this migration, if one could call it such, was the fact that extensive bush fires were raging some two miles to the south, and the scent of burning scrub was very strong. Several large Crane flies hovered into the beam of light, probably disturbed from their slumbers, as they are typical day-flying insects.

A large weevil of the genus *Poropterus* was found busily drilling a hole into a dead limb of a Beech tree. Many old logs were carefully examined, and upon most of them were seen many of the Tenebrionid beetles, *Apasis howitti*. During the daytime these insects are always concealed under or inside rotten logs, but, during the dark hours, they become very active. Some examples of the somewhat rare Carab

beetle, *Melisodera pricipennis*, were found crawling on the trunks of stringy-barked Eucalypts.

Directing the rays upon the ground, several spiders were seen hurrying through the carpet of fallen leaves, and a fair-sized centipede noticed holding one of the previously-mentioned brown caterpillars in its mandibles. The next object of interest was a beautiful tree frog (*Hyla*), which was resting upon a small limb of a musk tree. The bright light apparently did not inconvenience him, as he appeared content to stay there as long as I wished to view him. Several specimens of the dark form of *Adrium artifex*, a small Longicorn beetle, were observed upon a freshly-fallen Eucalypt, where they were no doubt seeking suitable situations for depositing their eggs.

The light next revealed a beautiful moth resting upon the trunk of a Sassafras tree. It was a species of the genus *Colussa*, and, with its brightly-shining eyes, quivering feathered antennæ, and wings resembling rich brown velvet, it was indeed a thing of beauty.

A rustling sound amongst the leaves of a Hazel tree drew my attention to a pretty little Ring-tailed Opossum, and he remained perfectly still, apparently dazzled by the bright light. Some small black ants were hurrying up a dead tree, each bearing a pupa, whilst at the foot of the tree there was a specimen of the brilliant-hued Carab beetle, *Notonomus opulentus*. The sound of running water suggested looking for aquatic insects, but the only things moving were some small, very active, shrimp-like crustaceans.

As my light was now beginning to give out, I had to relinquish my investigations, but I am looking forward to spending another interesting evening when an opportunity offers.—F. E. WILSON.

PARASITISM IN THE SANTALACEÆ.

Root parasitism has already been proved in the cases of many santalaceous plants; of Australian species notably in *Exocarpus cupressiformis*, by Dr. Benson, and in the Sandalwood and the Quondong, by Mr. D. A. Herbert. Suspicion is doubtless directed to these by the impossibility of transplanting them successfully, or of cultivating them from seed.

In the *Journal of the Royal Society of Western Australia* for 1924-25 Mr. Herbert convicts seven other members of the

family of the same degrading habit. These are *Fusanus spicatus*, R.Br., *F. acuminatus*, R.Br., *Leptomeria preissiana*, D.C., *L. spinosa*, D.C., *Choretrum lateriflorum*, R.Br., *Exocarpus aphylla*, R.Br., and *E. spartea*, R.Br. All were found to develop numerous lateral haustoria, which penetrated the roots of the host plants more or less deeply, but not attacking the wood. All also seemed to be auto-parasitic. The haustoria varied greatly in size. In *Leptomeria preissiana* they attained a diameter of one-third of an inch, in *Exocarpus aphylla* a quarter of an inch. In *E. cupressiformis*, a much larger plant, they had been found so small as to be discernible only with the aid of a lens. Only in *E. spartea* were they developed apart from the presence of alien roots.

Leptomeria spinosa alone showed discrimination in the choice of a host, the others not being at all particular in this respect. While some species like *Exocarpus aphylla* grow in such close proximity to another plant, or even appearing to grow out of it, as to at once suggest parasitism, others like *Fusanus acuminatus*, by its isolated position, seemed to disarm suspicion until the length of its roots, sometimes extending for a distance of twenty yards, showed its ability, in spite of distance, to reach those of its victims. As in others of their kind, root hairs were almost or entirely wanting.—C.S.S.

PHOTOGRAPHS FOR "THE NATURALIST."

It is proposed, while funds permit, to include one plate at least in each issue of the *Naturalist*. Members are invited to submit prints for consideration by the Editor and the Publishing Committee. Unusual subjects are desired, not photographs of scenery, etc. Writers of papers might submit photographs suitable for illustrations.—Editor.

All contributions for the *Naturalist*, and letters to the Editor, should be addressed:

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EXCURSIONS.

SATURDAY, 13th FEBRUARY.—Botanic Gardens. Members are invited by the Committee to a Social Afternoon. Meet at Office Gates at 2 p.m.

SATURDAY, 20th FEBRUARY.—Black Rock. Object: Shore Life. Leader, Miss J. Raff, M.Sc., F.E.S. Meet at Flinders Street Station in time for 1.35 p.m. train.

SATURDAY, 27th FEBRUARY.—Frankston. Object: General. Leader, Mr. A. L. Scott. Meet at Flinders Street Station in time for train at 1.20 p.m.

SATURDAY, 13th MARCH.—Zoological Gardens. Meet at Main Gates at 2.30 p.m.

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— OF —

The Field Naturalists' Club of Victoria.

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The Author of each article is responsible for the facts and opinions recorded.

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1926.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 8th MARCH, 1926.

1. Correspondence and Reports.
2. Election of Members.
3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. By Mr. C. Oke—"Two Entomologists in the Mallee."

2. By Mr. W. J. Parr—"Additional Microzoa from the Red Limestone of Grange Burn, near Hamilton, Vic."

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

VOL. XLII—No. 11

MARCH 5, 1926

No. 507

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, February 8, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about 50 members and friends were present.

REPORT.

Mornington, January 30.—The leader, Rev. G. Cox, forwarded a report of this excursion, which showed that though very few members availed themselves of this opportunity of visiting Mornington, an interesting programme was carried out successfully.

ELECTION OF MEMBER.

On a ballot being taken, Master Fred. Barton was duly declared elected as an associate member of the Club.

GENERAL.

Bush Fires.—The Hon. Secretary, Mr. C. Oke, referred to the widespread bush fires. He had been, on the previous day, at Warburton, where large areas along the railway line, particularly between Mt. Evelyn and Wandin, and between Millgrove and Warburton, had been swept by fire. The whole of Mount Little Joe, as seen from the line, appeared to have been burnt out. He thought that an article might be published in the *Naturalist*, indicating the extent of the areas devastated by the fires. In future years it would form a reference, and would also enable some idea to be formed as to the time required by a fire-swept area to regain its normal state.

Mount Everard Reservation.—Miss Nokes stated that bush fires had been burning on the mountain, and probably had swept the area it was proposed to reserve. If such was the case, the local Progress Association would, most likely, let the project lapse.

LECTURE.

“Along the Queensland Coast—A Biological Tour,” by Mr. P. C. Morrison, M.Sc. This lecture was illustrated by a large number of excellent lantern slides, showing various forms of animal and vegetable life, also some very interesting views along the Queensland coast. Several members spoke in appreciation of the lecture and the lantern views.

The meeting closed with the usual short conversazione.

EXHIBITS.

By Rev. G. Cox: Fossil leaves of *Lomatia*, *Nephelites* and *Mollinedia*, from Balcombe Bay; also lignite from the same locality.

By Mr. J. R. Leslie: Bifurcation in frond of *Lomaria*.

By Mr. P. C. Morrison, M.Sc.: Plates from the carapace of the large Queensland turtle; corals from the Great Barrier Reef; and aboriginal weapons from Queensland.

By The National Herbarium, on behalf of the Rev. A. C. F. Gates, M.A., of Lara, who has been botanising on Mt. Erica and surrounding region:—*Baekea Gunniana*, Schauer, Mountain Heath Myrtle; *Baekea*, probably new to science; *Callistemon Sieberi*, D.C., Alpine Bottle-brush; *Senecio vagus*, F.v.M., Saw Groundsel; *Senecio pectinatus*, D.C., Alpine Groundsel; *Helichrysum rosmarinifolius*, Less, Rosemary Everlasting; *Olearia floribunda*, Bth., Heath Daisy-bush; *Helichrysum lepidophyllum*, Tovey and Morris, Clubmoss Daisy-bush; *Celmisia longifolia*, Silver Daisy; *Gentiana (saxosa) montana*, Forst., Mountain Gentian; *Prasophyllum Tudgellianum* and *P. Suttonii*, Rogers and Rees.

EXCURSION TO MORNINGTON

The programme of the Holiday Week-end Excursion began with the departure from Mornington on Saturday, January 30, at 9 a.m., of 11 members of the local Naturalists' Club, three visitors and the leader. At Mooroodue the arrival of the train from Melbourne was awaited, but no F.N.C. members came by it. After lunch the party walked to the large quarry, where a wonderful face of rock of Ordovician age is exposed. By means of specially-prepared cards, and the external evidences in the quarry itself, the leader explained the relative age and formation of the rock mass.

Mt. Eliza, at the back of the quarry, was ascended, and from the summit a fine panoramic view was commanded. A walk along the ridge, through the bush, brought us to a granite outcrop, which has been partly opened up. The stone appears to be of very fine quality, and greatly resembles the well-known Harcourt granite [clear white felspar and black (biolite) mica]. A ramble in another direction led to the banks of a reservoir (nearly dry), from which numbers of valves of the fresh-water mollusc (*Pisidium* sp.) were collected. A bush track led back to the quarry. On the way to the station several interesting botanical specimens were gathered, including a fine spray of *Dianella laevis*, with purple seed-berries. A halt was made at a wayside pool, on the surface of which floated water-lilies, in full bloom. Among the water-weeds skirting the pool a rich harvest might have been gathered for pond-life study.

The train by which we returned to Mornington brought two lady members of the Club. After tea, reinforced by 13 young men, visitors, the party attended, by invitation, at the leader's home. A collection of aboriginal weapons and implements (about 160 pieces) was examined, the leader giving a descriptive talk; then the local Club's collections were viewed.

Sunday was spent according to the individual tastes of members. On Monday the first party, consisting of 18 local members and two visiting members, assembled, at 9.30 a.m., and walked to Fossil Beach. Here a camp was established, and the party dispersed over the Balcombian fossil beds. Meanwhile, the leader returned to the station to meet the Melbourne train, by which arrived three lady members, who were driven out to join the advance party. After lunch the party set off for the Balcombe's Bay leaf beds (Miocene), passing *en route* the brown coal deposits, and turning aside to visit a gully in which flourishes the Plume Humea (*H. elegans*), now only in bud. The spot on which Captain Matthew Flinders landed, in April, 1802, was seen. The way led over several rocky outcrops, among which (as the tide was very low), a number of chitons was taken. Most of the specimens seen at the leaf-beds were fragmentary, though some good specimens have been obtained there on local Club excursions.

Some members of the M.N.C. had erected their tents on the beach, and a few of the younger ones enjoyed a swim. After returning and resting at the "dump," another visit was

made to the marine shell beds. No great finds can be chronicled, though a good assortment of the species characteristic of the beds was found. Among the living types of interest taken were a fine large hermit crab, and the boring mollusc (*Barnea obturamentum*), in burrows in the clay. The day was ideal for collecting, the tide being so low, and the water perfectly still. The children joining the local Club have proved themselves experts at collecting, one girl, 11 years of age, having recently collected nearly 100 chitons during an afternoon, many of them hardly visible to the naked eye, and none of them over three-quarters of an inch in length. A number of botanical specimens claimed notice during the day, but no new or unusual types were recorded.—REV. G. COX.

EXCURSION TO WILSON'S PROMONTORY

The sixth Club excursion to Wilson's Promontory took place during the New Year holidays. On January 2 eight members travelled in a covered waggon from Fish Creek. Passing through the western extremity of the Hoddle Range, over an area bearing everywhere evidences of the ruthless destruction of the once dense forests and luxuriant fern gullies, the low-lying heath or moorland was crossed, to Fisher-man's Camp, thence down the beach to the Darby River.

At the Inlet Sahara-like stretches of sand intervene when the tide is out. This coast is interesting in showing phases of the denudation of land and encroachment of sea, varied by successful resistance and approach by sand-dunes against the action of wind and tide. In the former case the planing down of what appear to be either old swamp-beds, with peaty bottoms, or extensive carbonaceous deposits, derived from sea-weed, and the inroads made on the clumps of *Bank-sias*, many trees of which are washed right out on the verge of the sea, are evidences; in the other, the heaping up of the sand in the shallows around the slightest obstruction, the growth of grass-tufts, then tussocks, and, further back, coastal scrub as sand-stays, consolidating and extending as dunes the line of defence and advance, are equally striking.

During the week we rambled in the neighbourhood of the chalet and the Darby River, Tongue Point, and the Darby spur and saddle, as far as the southern limit of Norman Bay, and along the telegraph track to Bad Saddle, with

deviations therefrom to Lilly-pilly Gully and Sealers' Cove respectively; the latter a two-days' journey. Since last year a hut has been built at Sealers' Cove, and another at Tidal River, for the convenience of campers. The tracks are in good order; that to Lilly-pilly will ultimately be extended to the head of the Gully, where a waterfall about 15 feet in height adds to the beauty of this sylvan retreat. In a home paddock two or three kangaroos or wallabies and an emu are kept for observation by tourists who are unable to make long excursions. The season for wild-flowers was almost ended, but 76 species were noted in bloom, some only scantily. *Bursaria spinosa*, *Cassinia aculeata*, *Lotus australis*, *Thomasia petalocalyx*, *Senecio laetus*, *Scævola suaveolens*, *Lobelia purpurascens*, *L. anceps*, *Olcaria axillaris*, *Viminaria denudata*, with the Banksias, Hakens and Xanthorrhæas, were more profuse in flowering. Among the orchids, *Dipodium punctatum*, *Gastrodia sesamoides* and *Thelymitra longifolia* were in flower. Most of the leguminous plants were in fruit, as were *Ricinus pinifolius*, *Leucopogon Richii*, *Erocarpus stricta*, etc.

There is a noticeable tendency to communal growth in the National Park, e.g., the dense grove of Casuarinas on the Darby spur, the fine Banksia groves beyond the densely-clustering Melaleucas and Leptospermums of the river flat, the imposing array of grass-trees on various areas, the profusion of Lilly-pillies in the gully appropriately bearing the name, the extensive thicket of hazels marking the approach and some part of the slope in the descent to Sealers' Cove, and then the distinctive fern-gully vegetation of that moist and sheltered area. This characteristic may be noted also in the species of Eucalypts, and in the grouping of morass and swamp vegetation.

The trip to Sealers' Cove was completed before a heavy rain-storm. It was noted that the growth of Myrtle Beech is very much more extensive than was thought to be the case, many young plants growing in the rich soil. At the Cove an easterly wind, with a heavy sea, beat into the bay, while the rain-storm had for precursor the gathering of thick cloud-wracks on the mountains enclosing the Cove. Several birds, including two Little Penguins, *Eudyptula minor*, were found dead on the beach. Fortunately the rain kept off until our return.

During our stay at the Park three or four kangaroos and about 10 wallabies were seen, the Black-backed Wallaby,

Macropus walabatus, being the more plentiful. In some instances the animals showed little fear of observers. Of course, a single individual has the better chance of seeing animals, which a large party will disturb. About half a dozen Koalas were observed, chiefly on the blue gums. One, at Sealers' Cove, was perched at a great height. Evidences of the presence of wombats were noticeable. It was interesting to hear from two independent witnesses of an animal having been seen at Lilly-pilly which answered to the description of the Bush-tailed Rat or Tuan. Mr. Hanks, on a visit to the Light-house, saw through the glass about 20 seals disporting on a rocky island to the westward. A few small snakes were seen, two of which—copperheads—were despatched. A visitor reported having seen an antlered deer towards the Vereker range. There are deer on Snake Island, but I am not aware that deer have been introduced to the Promontory. The lizard, *Egernia whitii*, was numerous, and sustained the reputation previously earned for friendliness. One was almost reduced to a torpid state by eating to repletion of March-flies, supplied by Mr. V. Miller; while another pretty, copper-coloured lizard fearlessly caught flies on the writer's hand and coat-sleeve. Galaxias, or mountain-trout, are numerous in the creeks. At Lilly-pilly Creek they ate greedily the scraps thrown into the stream, and allowed Mr. Miller to stroke their sides gently with a switch. The largest seen was just over six inches in length.

Birds were very numerous and tuneful, especially in the sheltered hill and river scrub near the chalet. At daybreak one can hear the full, rich notes of the Harmonious Thrush, the matutinal song of the Magpie, the passionate call of the Coach-whip Bird, the harsher cries of Honey-eaters, the cheerful twitter of Acanthizas and Scrub-wrens, the dour note of the Bronzewing, and the challenging song of the Butcher-bird. Blue Wrens are at home at the chalet. The Swallow still rears broods under the back verandah, and a Kookaburra takes stock of visitors from a neighbouring post. We heard the mournful cadence of the Pallid Cuckoo, and also the Bronze Cuckoo's note. Over the river an occasional Cormorant flew, a White-fronted Heron lazily changed his location, or a few Ducks followed the windings of the stream. A Lyre-bird was seen near Sealers' Cove, and their imitative calls were also heard. Special observation was made of the birds, more than 50 species being noted by the party, and listed carefully by Miss McMahon and Mr. Hughes. Among these were the Black

Cockatoos, which, with Wattle-birds, affect the Banksias. A colony of Emu-wrens was located by Mr. Hanks near Whisky Creek, and among the Parrakeets Crimson Parrots were numerous. Streperas were seen in timbered country. Among sea-birds, the two species of Oyster-catcher, White-bellied Sea-eagles, Pelicans, Pacific gulls and Australian Curlews were observed.

The Emus introduced to the Park favour the more open, grassy country. They have prospered, and are a source of attraction to visitors. It is a pity to find that, during the last year, clutches of young have been almost destroyed by foxes, one of which was seen at Sealers' Cove. As with dingoes in the past, the increase of foxes is favoured by the character of the country. In regard to introduced birds, three of the party recognised the Blackbird's song, but the bird was not seen. The Goldfinch is travelling southward; it was seen at Fish Creek.

Insect life seemed numerous, varied and vicious. Sand-flies and March-flies overpowered tourists with unwelcome attentions, whilst *Culex irritans* was unusually alert.

In a previous report mention was made of the wreckage cast up along the Western coast, against which the prevailing drift current strikes in its eastward course. On the shores of the bay lies a considerable quantity of timber, pine and blackwood, with scores of bent rims, in sets, for buggies and other vehicles. This is from the wreck of a vessel carrying timber, which foundered, less than a year ago, near Cape Liptrap. Many good, but empty, barrels are cast up on the shore.

We returned to the city on January 11. I would suggest a well-organised excursion by boat on some future occasion to the Eastern coast of the Promontory, with Sealers' Cove as a base for operations.—CHARLES DALEY.

Mr. Charles French, senr., one of the founders of the Field Naturalists' Club of Victoria, and former Government Entomologist, will contribute several articles to the *Naturalist*. They will deal chiefly with the early days of natural history in Victoria, and, besides relating his own experiences as an entomologist and botanist in the field, Mr. French will give memory pictures of other pioneer naturalists. The articles will be illustrated with portraits.

ALONG THE QUEENSLAND COAST

A BIOLOGICAL TOUR

(Notes on a lantern lecture delivered before the Field Naturalists' Club of Victoria, February 8, 1926)

BY P. CROSBIE MORRISON, M.Sc.

Travellers of the Seven Seas two centuries ago returned home with tales of fairy islands where every prospect pleased; where one had only to enjoy oneself; where choice fruits—satisfying food—dangled temptingly from every tree; and fuzzy-haired beauties were waiting to dance attendance upon the fortunate traveller. And whenever the hearers, becoming enraptured, seemed to forget the fortitude of the narrator, he had but to dwell for a moment upon the awful dangers of the coral, to make them turn pale with fear, and murmur a prayer of thankfulness that their paths led away from tropical waters, and that they still held to foggy England.

Coral was the dread spectre in the life of the mariner. Many a proud ammiral ground out her life against the treacherous horns of some hidden reef, and stout was the heart of him who would seek out new lands among the Coral Seas.

In 1770 Captain James Cook had the experience of imminent shipwreck on the Endeavour Reef, close to the town which now bears his name; and only by beaching his ship for repairs in the Endeavour River was he able to pursue his homeward course. Thirty years later Captain Matthew Flinders sailed right along the Great Barrier Reef, and chartered fairly accurately the 1600 miles of its western fringe. After that date the Reef was touched upon intentionally only by a few naval survey vessels, such as the "Thetis" and the "Rattlesnake," and unintentionally by a few of the early immigrant ships, such as the "Wansfell," whose perilous trip in 1861, when she arrived from England three months overdue, carrying a full complement of immigrants all on the verge of starvation, has been immortalised by numerous entries on the Admiralty chart of the Coral Sea.

As time went on, it became increasingly evident that the charts of this region—mainly those of Flinders, which have remained almost untouched for more than a century—con-

tained a number of inaccuracies. The action of the Admiralty in sending out specially-equipped survey ships to undertake charting work on the Reef for an indefinite period, so aroused public interest in the less fearsome and more interesting aspects of this unique geographical possession of ours, that the Great Barrier Reef Committee was formed, with headquarters in Brisbane, to undertake and direct the scientific investigation from various standpoints—mainly geological and biological. It was in the latter capacity that the writer was sent to Brisbane in 1925, and thence to the various points of interest along the coast. The work done was mainly microscopic, and, since the macroscopic material obtained contains nothing new to science, only a few notes on the more interesting features of the general work are given here.

Travelling overland from Victoria to the North, little difference is noted in the general aspect of the country. The same types of Eucalypts seem to follow one from Wilson's Promontory to Cape York, with small breaks of tropical jungle of palm, and fig, and lawyer-cane in the moist parts, such as the coastal region from Cardwell to Cooktown, and upon the Atherton Tableland. Xanthorrhœas of slightly differing species spread before one all the way up, and the aspect of the drier plain country is thus fairly uniform, in spite of the change into tropical latitudes.

One surprise for the traveller is the pine-clad slopes of the continental islands of the Whitsunday and Hinchinbrook Groups, hundreds of miles north of the Tropic of Capricorn. In the distance these Araucarias resemble the Northern pines, and one is faced with a sub-arctic scene with a shade temperature of over the 100 mark. Typical plants set their mark on different areas, and on lightly-timbered country one sees numbers of the palm-like "screw pine," "bread fruit," or *Pandanus*, a lonely relic of the group Pandanaceæ, which flourished in a bygone age. Then the strand flora includes such plants as the spiny-seeded *Tribulus*, the goats-foot *Convolvulus*, *Ipomea pes-capri*, the Candle-nut tree, the Coral Laburnum, *Tournefortia*, *Scævola*, *Hibiscus*, and *Morinda*, all of which form a dense background of shrubbery through which tower the graceful stems of the coconut palms, *Cocos nucifera*. The coconut, by the way, is not a native, but is planted on practically all the islands along the coast for the benefit of men who may be cast away with no other means of sustenance.

The mud flora is always very typical, too, consisting of the three main Mangrove genera, *Avicennia*, *Rhizophora* and *Bruguiera*, occurring in belts from sea to shore in that order. Associated with these curiously-specialised trees we find a number of smaller salt-resisting plants, of which the most common is the holly-leaved *Acanthia ilicifolia*. Stretches of bare mud in a Mangrove swamp can always be depended upon to yield, besides the sandflies and mosquitoes, a whelk-like *Telescopium* and a Grapsoid crab, *Metopograpsus messor*; and usually the whole of the dead wood is riddled with the boring mollusc, *Teredo*.

The coral reefs are a disappointment if one sees them uncovered by an exceptionally low tide, for then all the polyps close, and the gorgeous colours largely disappear. But dive into the lagoon when the reef is covered, and the gaudiness is amazing. Clashing colours on every side make the scene appear as if taken from some extravaganza, and the specious beauty is a thing never likely to be forgotten. Although the main part of the reef will be of all one type of coral, such as the massive *Porites*, or the stag-horn *Acropora* and *Pocillopora*, the holes are a shelter for the numerous more delicate forms, and grouped together one may see small knobs of *Favia*, *Calocoris*, and *Meandrina*, in the shallower parts; and, a little further down, the delicate stag-horn, *Seriatopora*, the carnation coral, *Euphyllia*, and such others as *Galaxea*, *Hydnopora*, *Pavona* and *Fungia*.

On these reefs, too, one finds Beche-de-mer, *Tridacna*, the giant clam, with the largely undeserved reputation for drowning people; *Diadema*, a sea-urchin with needle-like spines a foot in length and charged with a painful poison; *Lima*, a bivalve, which swims actively by flapping the valves of the shell together; brilliant polychaete worms with crowns of gaudy tentacles; and the giant sea-anemone, *Discosoma*, which attains a diameter of 15 inches, and shelters many smaller animals as commensals within its coelenteron.

The crabs in the reef region include three gregarious types, which are of interest. The first, *Myctiris longicarpus*, has a close relative to be found in large numbers round about Black Rock, Port Phillip Bay, where an army of some hundreds dig into the sand when disturbed, marking their resting places with typical rosettes. The armies in the North are similar, but many thousands strong, and their progress can be heard from a considerable distance

sounding like the loud rustle of leaves in a wind. Then there is *Scopimera inflata*, the Sand-bubbler Crab, which feeds on the organic particles adherent on the sand grains left by a receding tide. All the used sand is rolled up by the chela into little spherical pellets, which are cast away in radiating lines round the burrow for a radius of about ten inches. *Uca marionis*, the Calling Crab, also is a burrowing form; the male has the right chela enormously developed, so that it hides the whole of the body as seen from the front, and coloured a brilliant orange. A crowd of these crabs on the beach resembles a patch of orange beans, and a chance movement on the part of the observer acts like the wave of a magic wand. A thousand brilliant claws are brandished in the air in a beckoning fashion, a thousand chela give as many loud "cracks," and lo, the flat is bare of colour, as, with incredible swiftness, the crabs tumble down their burrows.

The thousands of Sooty Terns, *Sterna fuscata*, seen breeding on Oyster Cay have already been described under "exhibits" in a previous "Naturalist." The turtle-hunting was much the same as that enjoyed by all visitors to the Reef; and the Green Ants are always there. These "paper-bag" ants live in bag-like nests, made by fastening together a number of leaves. Never have I seen more aggressive insects; a touch of the nest is sufficient to call out the guard, all straining to reach the intruder. Once I had the misfortune to run my head into a nest in the undergrowth, and had to disrobe completely in order to rid myself of the vindictive little creatures. Their grip is so tenacious that one may pull them asunder before they will release the skin grasped between their mandibles. Cause have I to remember the Ngerrikudi name for this insect—"auau." Obviously some aboriginal etymologist, in early times, had had my experience, and was verbally inspired.

The Editor again appeals to members to contribute nature notes suitable for the Field and Study Section of the *Naturalist*. These pages, he has been assured, are popular; but more variety would be welcome. Paragraphs recording personal observations are most desired.

VICTORIAN FERNS

By H. B. WILLIAMSON, F.L.S.

PART III.

Family MARSILIACEÆ.

In this family fronds spring, as in many ferns, from a rhizome, and are rolled inward at the top (circinate) when young; and, like some ferns, Marsilia produces sterile and fertile fronds, the latter being developed from the lamina of the frond, which is recurved and closed to form a utricle or involucre (often called a sporocarp), enclosing the spore cases which are of two kinds, and are attached as sori to the underside (inside) of the utricle.

Genus MARSILIA.

The name of the genus is from the latinised form (Marsilius) of the name of an Italian naturalist Marsigli.

To various species the name "Nardoo" has been applied, and sporocarps have been used among the blacks as food. Burke and Wills tried to sustain their lives by the aid of Nardoo. A. Braun in 1870 indicated as many as 14 distinct species, many of which were included by Mueller under the name *M. quadrifolia*, L. Bentham and other botanists have failed to appreciate Braun's distinctions, and it is probable that only half-a-dozen Australian species at most can be sustained. The Victorian forms seem to lie within the limits of the descriptions of the two following species.

MARSILIA DRUMMONDII, A. Braun. Nardoo (Fig. I). This grows in temporarily inundated depressions; sometimes in water six or eight inches deep, with its pretty reddish-green sterile fronds floating on the surface. These fronds consist each of four segments, reminding one of clover leaves. In drier clay flats the fronds are much shorter, and the segments sometimes only a quarter of the size indicated, and often very hairy and lobed or crenated (Fig. II). When one looks at the extreme forms they can scarcely be accepted as the same species, but when one tries to separate the complete chain of intermediates one can realise the difficulty

which caused Mueller to lump them as forms of *M. quadrifolia*, L., the distribution of which is given in the Australian Census, 1889, as all States of Australia, and As., Af. and Europe.

M. HIRUTA, R.Br. (Fig. III). Short-fruit Nardoo. This is a form with the sporocarps sessile or nearly so, otherwise scarcely to be distinguished from the preceding species. The regional distribution requires investigation, as it was formerly placed as a form of *M. quadrifolia*. We have specimens from the North-west and from Geelong district.

Genus PILULARIA.

This genus differs from *Marsilia* in having the sterile fronds filiform instead of being expanded into flat leaflets.

PILULARIA NOVE-HOLLANDIE, A. Braun, Pillwort, W.A., S.A., Tas., N.S.W., E., As., Af., N.Z. (Fig. IV). This plant, owing to its small size, is rarely gathered. Its rhizome creeps under water, and it has thread-like sterile fronds about half an inch long. Its fertile fronds are the pill-like sporocarps about one-tenth of an inch in diameter on short stalks. It may be looked for on the muddy beds of drying water-holes in the N.W., S.W., and S. of our State.

Family OPHIOGLOSSACEÆ.

The plants of this family have not their young fronds circinate as in other families of ferns, and their spore-cases are comparatively large, and are set in two rows on the simple or branched fertile fronds.

Genus OPHIOGLOSSUM.

OPHIOGLOSSUM CORIACEUM, A. Cunn. Adder's tongue. (Fig. VII). Very widespread through the world.

This curious little fern does not favour fern gullies, but may be found in damp clay paddocks in early spring in all districts of the State. The author has gathered it on the alluvial flats of the Murray at Mildura in patches of clay showing little grass or other vegetation. A barren lanceolate frond an inch or two long and half-an-inch broad, of rather thick texture, and a linear fertile frond bearing two rows of spore cases, spring from the single stem. The latter has a fancied resemblance to a snake's tongue.

•Genus BOTRYCHIUM.

This genus differs from the last-named by having its fronds much divided into segments, and is named from the Greek *botrys*, a cluster of grapes, referring to the arrangement of the spore cases.

BOTRYCHIUM LUNARIA (L.) Sw. Moonwort, Tas., N.S.W., E., As., Af. (Fig. V). This, the "Moonwort" of the old world, is rare in Victoria, having apparently been gathered only by Mueller, Cobungra (Bright to Omeo), "Snowy Plains, on the Ovens, Goulburn, Caboga and Mitta Mitta Rivers." Spore cases are produced on a branched frond 3 to 5 inches long, and its barren frond has semi-circular segments (moon shape) pinnately arranged.

B. AUSTRALE, R.Br. Meadow Moonwort, Tas., V., N.S.W., Q., As., Am., N.Z. (Fig. VI). This fern has been recorded from all districts of the State except the north-west, though it has been frequently overlooked. Mr. F. G. A. Barnard has in cultivation a specimen, gathered at Oakleigh, in July, 1892; it has been exhibited at several meetings of the Club. Mr. F. Pitcher reported the species from Lima East, in 1925, and Dr. Heber Green found it at Mooroolbark recently. It is common on the western side of the Snowy River mouth.

Its barren fronds are fernlike, divided into three primary pinnae, which are again pinnate with segments denticulate. The veins are almost concealed in the thick texture of the fronds. The fertile fronds are much branched, the branches bearing large spore cases sessile in two rows.

In the course of excavation at a brickyard in the village of Prednont, some 100 miles north-east of Vienna, a remarkable discovery was made. At a depth of 14 feet, in a bed of Löss, formed of the debris from glaciation of a lime-stone out-crop nearby, Professor D. K. Absolon, of Prague University, curator of the museum at Brünn, found a tomb containing 20 human skeletons. One wall of the tomb is composed entirely of the shoulder-bones of mammoth elephants, showing that these prehistoric people were "mighty hunters." Professor Arthur Keith, in an article in the London "Daily News," of October 31, 1925, describes this ancient hunting station as the most remarkable and extensive known. From the skull measurements, Professor Keith states, the men belonged to the Auragnacian period, which dates back at least 15,000 years. The tomb was covered by a heavy layer of stones 16 inches thick, evidently to protect the remains from hyenas and wolves. How did man, in those remote days, with his rude stone weapons, manage, contend with, and kill the mammoth elephants in such numbers as this tomb betokens?—A.E.K.

THREE VICTORIAN SPECIES OF OPHICARDELUS (CLASS MOLLUSCA)

BY TOM IREDALE.*

Twenty years ago Mr. J. H. Gatliff published in this journal a "Catalogue of Victorian Estuarine Univalve Mollusca" (Vol. XXII, pp. 13-16, 1905), and I cannot find that much has been added thereto since. Twelve species were listed, and under the genus name, *Ophicardelus*, one species, *O. australis*, Quoy and Gaimard, only appears. As localities at that time known—Back Beach, Williamstown, Port Phillip, and Hastings, Western Port—only are cited, probably many others are now known.

At Lakes Entrance, Victoria, Roy Bell collected three clearly distinguishable species, and these were easily identified at the British Museum as *O. stutchburyi*, *O. quoyi* and *O. ornatus*. Hedley, in his Check List of New South Wales Marine Mollusca, included the Estuarine forms, and there two species were ranged under *Phytia ornata* and *sulcata*.

At Church Point, Broken Bay, New South Wales, I collected three species, determined as *ornata*, *sulcata* and *quoyi*. Comparison showed that the specimens referred to as *sulcata* agreed with those determined as *stutchburyi*, and consequently these names are synonymous. As the latter was described from Port Curtis, Queensland, it extends along the east coast from there to Lakes Entrance.

Hedley was of the opinion that *quoyi* had been erroneously recorded from Port Jackson, and that it occurred in New Zealand. While it is common here, the New Zealand shell varies, and has a name already, *costellaris*. Again Mousson's two species, which Hedley suggested were synonymous with *ornatus*, I determine as *quoyi*.

In order to clarify this matter, I present figures of the three species, with their names and distribution:—

OPHICARDELUS ORNATUS (Férussac). (Fig. 1.)

Auricula ornata, Férussac. Tabl. Syst. Anim. Moll., p. 103, 1821: Hab. (?)

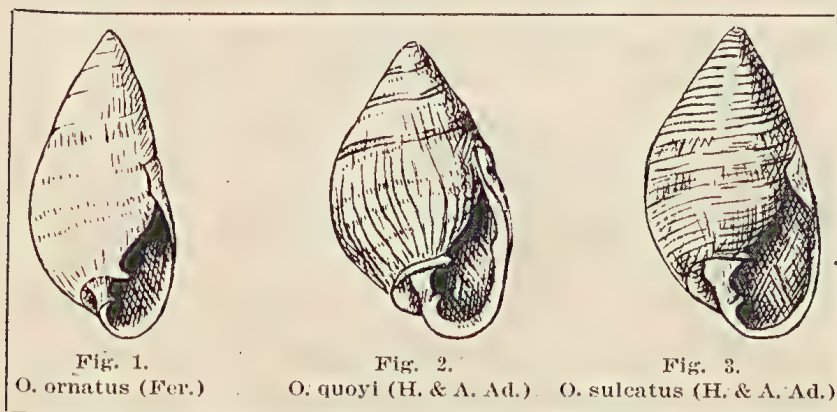
*By permission of the Trustees of the Australian Museum.

Auricula ovata, Gray. Spicilegia Zoologica, pt. I, p. 5, pl. 6, fig. 21, 1828; "South Sea Island, Stutchbury." Probably Sydney, N.S.W. (Not *A. ovata*, Lam., 1806.)

Auricula australis, Quoy and Gaimard. Voy. Astrof. Zool., Vol. II, p. 169, pl. 13, figs. 34-38, 1832; "Western Port, Vic., and V.D.L."

Auricula bidens, Potiez et Michaud. Galerie Mollusques Douai, Vol. I, p. 201, pl. xx, fig. 9-10, 1838; "Nouvelle Hollande."

Cremnobates cornea, Swainson. Papers Proc. Roy. Soc., V.D.L., Vol. III, pt. I, p. 43, pl. vii, fig. 1, Jan., 1855; near Hobart Town, V.D.L.



Opicardelus australis, Tate and May. Proc. Linn. Soc., N.S.W., 1901, p. 419; Tas.

Opicardelus australis, Gatliff. Vic. Nat., Vol. XXII, p. 16. May 4, 1905; Vic.

Opicardelus ornatus, Hedley. Proc. Linn. Soc., N.S.W.: Vol. XXXVIII, p. 334, 1913.

Phytia ornata, Hedley. Check List Marine Fauna, N.S.W., Moll. M. 95, 1918; N.S.W. May, Check List Moll. Tasm., p. 88, 1921; Tasm. Illustr. Index Tasm. Shells, pl. 40, fig. 24, 1923; Tas.

Easily recognised by its shape and lack of sculpture; an incised line showing below the suture on the earlier whorls only; slight depression behind the inner lip; outer lip sharp, not thickened nor toothed.

Specimens examined from New South Wales, Victoria and Tasmania.

OPHICARDELUS QUOYI, H. and A. Adams. (Fig. 2.)

Ophicardelus quoyi, H. and A. Adams. Proc. Zool. Soc. (Lond.), 1854, p. 34, Jan. 10, 1855; Moreton Bay, Queensland.

Melampus tetricus, Morelet. Journ. de Conch., Vol. XII, p. 290, July 1, 1864; "Nouvelle Galles de Sud."

Ophicardelus irregularis, Mousson, Journ. de Conch., Vol. XVII, p. 64, pl. v, fig. 2, Jan. 1, 1869; "Iac Tom-Tom, près Wollongong,"—Tom Thumb Lagoon, near Wollongong, New South Wales.

Ophicardelus minor, Mousson, Journ. de Conch., Vol. XVII, p. 65, pl. v, fig. 3; same locality.

Ophicardelus quoyi, Hedley, Proc. Linn. Soc., N.S.W., Vol. XXXVIII, p. 333, pl. xix, fig. 87, 1913; N.S.W.

A shorter, broader shell, showing irregular growth ridges on last whorl, an incised line below the suture present on all the whorls; no perforation, but a depression behind the reflected inner lip; the outer lip thickened, and with an indistinct tooth medially internally.

Specimens examined from New South Wales and Victoria.

OPHICARDELUS SULCATUS, H. and A. Adams. (Fig. 3.)

Ophicardelus (Laimodonta) sulcata, H. and A. Adams. Proc. Zool. Soc. (Lond.), 1854, p. 34, Jan. 10, 1855. Hab.: (?) Probably Sydney, N.S.W.

Melampus (Ophicardelus) stutchburyi, Pfeiffer. Proc. Zool. Soc. (Lond.), 1856, p. 393, May 8, 1857; Port Curtis, Queensland.

Ophicardelus sulcatus, Hedley. Proc. Linn. Soc., N.S.W., Vol. XXXVIII, p. 333, pl. ix, fig. 86, 1913.

Ophicardelus stutchburyi, Hedley. Proc. Linn. Soc., N.S.W., Vol. XXXVIII, p. 334, pl. xix, fig. 88, 1913.

Phytia sulcata, Hedley. Check List Marine Fauna, N.S.W., Moll. M. 95, 1918; N.S.W.

Strongly sculptured with revolving liræ; less marked on the body whorl; a small perforation persistent behind the reflected inner lip.

Specimens examined from Queensland (Port Curtis), New South Wales and Victoria.

AQUATIC INSECTS

It is surprising that more members of the Club do not devote themselves to the study of aquatic insects. The terrestrial forms claim many collectors (though not many real workers), probably because they force themselves under our notice by their brilliancy, or, maybe, their quaintness. But very few members think of exploring our lakes, ponds and streams for the wonderful forms that live in water. The study of aquatic entomology has, in fact, been almost entirely neglected by members, and the young entomologist who will devote himself to this branch of natural history is sure of a rich reward.

The dragonflies have received some attention in our State, but more in New South Wales, as Dr. R. J. Tillyard's splendid monograph on the Odonata shows. Dr. Tillyard has also studied the caddisflies, but the other Orders of insects have received very little attention. Occasionally one sees a few water-beetles in a collection of insects, but generally they are species that fly great distances at night, and are attracted by street lamps—and so find their way into the coleopterist's cabinet. There are many species of water beetles that are never seen out of their native element. Some of these are of great interest, others extremely rare; and they await the enthusiast who, armed with a collecting net and drag-hook, with which to bring up weeds from the bottom of deep pools, sets out to make himself famous, perhaps by the discovery of unique specimens.

I admit it is less easy to rear aquatic larvæ than it is terrestrial forms, but if the larvæ are taken when nearly fully grown the task is not so difficult, and many interesting facts may be recorded. The life-cycle of some aquatic beetles, from egg to imago, sometimes takes several years to accomplish—a long time to wait; but what valuable information concerning a species one would gain, if its life-cycle were worked out! A much quicker way is to place the beetles in an aquarium—covered to prevent their escape by flight—and watch carefully until the female has deposited her eggs.

Some beetles attach their eggs by an adhesive to the under side of leaves of water-plants; others make incisions in the cuticle of the stems, where they deposit their eggs. One large

Hydrophilus makes a water-tight cocoon, in which she lays her eggs. This is attached to the under side of a leaf, and has a ventilating shaft, or funnel, projecting above the water. Another species, a small, black beetle, resembling the terrestrial "sun beetle" in appearance, carries her eggs about with her in a light web attaching to the point of the abdomen.

When the young larvæ appear their shape should be noted and figured, as they sometimes alter after ecdysis, or moulting. When you are assured of the general appearance of the larva, nearly adult forms may be taken in ponds, and if these are placed in the aquarium you may succeed in obtaining the pupa, and later the imago, and so observe all the changes that take place during the life history.

The smaller beetles are found, generally, on water-weeds, and these must be carefully examined. Often the aid of a pocket lens is needed to detect the beetles, as they cling to the weed. Small curculios are often thus found. Other kinds hide under debris and stones, or bury themselves in the mud at the bottom of the pool, coming to the surface at intervals to breathe. The tip of the abdomen is held just above the surface-skin of the water, the elytra raised the merest fraction to allow the exchange of exhausted air for a fresh supply; and the insect dives to the bottom again. Some of these small beetles—*Pelobius* among others—make a chirping noise while thus engaged. This "chirp" is made by rasping the tibia over the edge of the elytra. A similar sound is produced by *Corixa*—one of the water-bugs—and in the same manner.

The collector will soon become familiar with the haunts and habits of water-beetles, and with the knowledge thus gained will soon have a well-filled cabinet of specimens, and note-books filled with details of life histories.

Aquatic Hemiptera also are worthy of study; the early larval forms of *Notonecta* and *Corixa* make beautiful objects for microscopical study, especially under dark ground illumination. Their eggs also are interesting. Small Hymenopterous insects that use their wings under water as if they were flying—and they progress fairly rapidly—are occasionally found. Nothing is known of their life history, nor of their anatomy. One species has a remarkable organ on the wings, which I believe to be respiratory in character. I have shown this, under the microscope, at Club meetings.

There must be large numbers of midges and other flies still undescribed; their aquatic larvæ are very beautiful,

and have remarkable structures. I was fortunate enough, on a Club excursion to Nyora, to be able to record as *new for Australasia* one genus, *Maclonix*. Other members of the group, *Corethra*, *Chironomus*, *Ceratopogon*, *Tanypus*, and many others, are to be found—sometimes in great numbers—in their larval stages in our ponds, and only await description.—J. SEARLE.

THE HOME AQUARIUM.

Aquaria have long been popular with a small number of nature lovers, mostly residents of Adelaide and Sydney. In both these cities Aquaria Clubs exist, and the interest in the hobby is steadily increasing. Should Melbourne lag behind her sister capitals? When in Sydney recently I went to Farmer's to view the famous "Fish Alley." It has become an institution, a delight to both adults and children: while several hundreds of tanks, I believe, have been purchased by citizens.

Mr. H. E. Finekh, the veteran aquarist, kindly showed me his wonderful private collection of fishes, amphibians and aquatic plants, that thrive in many glass-tanks and garden ponds at his home, Raglan Street, Mosman. He has a long record of success, and his enthusiasm for aquaria has never waned. The frogs and newts, and many of the lovely little fishes that he cherishes, are tame almost as the pet parrots and pigeons and kookaburras of the yard and garden. It was surprising to see two of the quaint Jumping-fishes, *Periophthalmus*, climb, with their fins, on to a flake of rock in the tank, and take food from their owner's fingers. (Often in North Queensland have I vainly tried to capture specimens of these elusive little fishes among mangrove roots.)

We have, in Australia, some freshwater fishes, suitable for the home aquarium, and desirable foreign species are obtainable, some at small cost, though others are expensive. If one commences on the right lines, and continues to follow them, an aquarium, I was assured, will be a continual source of instruction and pleasure. It is wrong to keep fishes in a bowl—they require a properly-constructed tank, or a pond, stocked with plants that have proved to be the best for aquaria. The plants themselves are beautiful and interesting; and Mr. Finekh has cultivated some remarkable species that are too little known in Australia.—C. BARRETT.



THE MANDALOTUS WEEVILS.

Among the largest genera of the family Curculionidæ, which comprises all those beetles known as weevils, is *Mandalotus*. All the species are small, and all are of dingy appearance, but they are notable for wonderful variety in structure.

Mandalotus occurs in all parts of Australia and Tasmania, and on many of the adjacent islands, but possibly nowhere are these beetles more plentiful than in Victoria. The majority of species are covered with a scale-like substance more or less interspersed with short setæ, but there are a few that are quite smooth and shining. One particularly fine species has its hind legs covered with a very long pale pubescence. For some years I have paid much attention to this interesting genus, and have a fine collection of specimens. Although so many species had been previously described, nearly all I secured proved to be new to science.

Mandalotus may be sought for with most success in moss and grass-tussocks, but leaf debris also often provides a rich harvest. In fact, according to Mr. A. M. Lea, who has recently completed a revision of the genus, the finest species of all was one I obtained by sieving leaf debris from beneath a tree-fern growing in the ranges above Millgrove. It is remarkable on account of the curious armature of its hind tibiæ. Two species, *crudus*, Erich, and *ventralis*, Blackb., occur rather frequently among the roots of Marram grass on the sea beaches at Lorne. Another rather plentiful species is *armivarius*, Lea, which may be obtained from moss at Ferntree Gully. Our Editor, at my request, brought some grass-tussocks from the summit of Mount Feathertop, from which I secured several examples of *decipiens*, Lea, a smooth, black, shining species. This beetle evidently is a

lover of high places, as the only previous records of habitat are Mounts Baldy and Hotham. One species, *Crawfordi*, named by Canon Blackburn, is credited with doing considerable damage to growing cereal crops in the Mannum district of South Australia. As far as I am aware this is the only black mark recorded against any member of the genus.

One of the largest species is *posticalis*, Lea, which I have taken occasionally in moss at Belgrave. It is a dumpy beetle with a somewhat mottled clothing, and, like most of its brethren, very lethargic in its movements. In fact, this latter characteristic leads to many specimens of *Mandalotus* being frequently overlooked, even by experienced collectors.
—F. E. WILSON.

AUSTRALIAN REPTILES AND AMPHIBIANS.

A Check List of the snakes of Australia is being prepared for publication by Mr. J. R. Kinghorn, C.M.Z.S., of the Australian Museum, Sydney, who, during the past few years, has done much to increase knowledge of our reptilian fauna. About 170 species of Australian snakes have been described, and it is probable that more will be discovered, but not many, since the Order, as represented in this country, is fairly well known. The latest novelty is a sea snake, from Northern Australia, and Mr. Kinghorn's description of it will be published shortly in the Proceedings of the Zoological Society, London. Its appearance is almost repulsive; thorny scales project from above the eyes.

During a recent visit to the Australian Museum I gleaned some facts concerning that institution's fine collection of reptiles and amphibians. Each of from 9,000 to 10,000 registrations is carefully noted on a catalogue card. The specimens on the shelves are in lettered divisions; each shelf in turn bearing an index letter, and each tier of shelves being lettered. The cards are arranged systematically, and an index of generic names tells one where to look, *e.g.*, the Black Snake, *Pseudechis*. Both cards and specimens will be found in division B, J, A. B equals batch of shelves; J, the shelf; A, first division. Such an arrangement means that any specimen presented, from the earliest days of the Museum until to-day, providing it has not been destroyed or sent away, can be found in a few seconds.

There are some 30,000 bottles, each containing an average of, say, six specimens, in the "Spirit House"; that is, reptiles,

fishes, crustaceæ and other groups, and each group is arranged and catalogued in the same manner; a work which took nearly 12 years to complete. The reptile collection contains many valuable and unique forms, as well as many which are yet to be examined, with the possibility of new species or varieties.

At the present time Mr. Kinghorn is working on a monograph of the reptiles and amphibians of the Solomon Islands.
—C. BARRETT.

A FAMILIAR FROG.

Widely distributed over the southern portion of Australia, the Brown Froglet, *Crinia signifera*, is one of the most familiar amphibians around Melbourne. I have found scores of specimens under stones and logs, and always in damp places. Lucas and Le Souef describe this Cystignathid frog as an "active little creature" ("Animals of Australia," p. 275), but it is easily captured, and often has indolent moods. I met with it in January last at an altitude of 5000 feet on Barrington Tops (Mount Royal Range), N.S.W. One example was found hiding under a log on dry ground, nearly a mile from water. In a gully of the lowlands, where a creek flows in good season, but parched now, another Brown Froglet was discovered among stones and withered ferns. It was tiding over a dry spell, not too happily, being in poor condition and inactive.—C.B.

Mr. Hugh Watson, of Cambridge, England, who has been studying the anatomy of several species of land molluscs from Victoria, makes the following comments in a recent letter:—The radula of *Succinea australis*, Fér, is of a fairly usual type; but the jaw is very characteristic with a dorsal plate such as is found only in the *Succineidae*, and in those strange slugs—the *Athoracopharidae*. Like most carnivorous snails, *Rhytida ruga*, Cox, has no jaw; but the long, narrow radula, with very large pointed teeth, is perhaps even a little more highly specialised than that of *Paryphanta atramentaria*.—Mr. Watson has kindly sent me a mounted radula of each of the species mentioned. That of *R. ruga* is a beautiful object for the microscope.—C. BARRETT.

Field Naturalists' Club of Victoria

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P. R. H. ST. JOHN, and F. E. WILSON, F.E.S.

EXCURSIONS.

SATURDAY, 13th MARCH.—Zoological Gardens. Object: Zoology. Meet at main gates at 2.30 p.m.

MONDAY, 22nd MARCH.—Observatory. Object: Astronomy. Leader: Dr. Baldwin. Meet at Observatory Gates at 8 p.m. As party must be strictly limited in number, names must be handed in as early as possible. Names handed in after party is complete will, unfortunately, be excluded.

SATURDAY, 27th MARCH.—Botanic Gardens. Object: Hybridization. Meet at Office Gates at 2 p.m. A leader will be appointed.

EASTER, 2nd APRIL.—Hopkins River. Object: General. Leader: Mr. V. Miller. Arrangements for this excursion will be announced at meeting.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 12th APRIL, 1926

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS—
Miss Joan Harper,
"Ncojee," Avalon Rd.,
Armadale
Mr. T. Greaves,
C/o Mrs. Hallett, Park Rd.,
Cheltenham

PROPOSER
Mr. C. Oke

SECONDER
Mrs. I. Healey

Mr. C. Oke

Mr. H. B. Williamson

AS COUNTRY MEMBER—
Mr. C. J. Daniels,
602 Kiewa Street,
Albury, N.S.W.

Mr. C. Daley

Mr. H. B. Williamson

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. By Mr. A. D. Hardy, F.L.S.—"Sperm Whale Head as a Sanctuary."
2. By Mr. H. B. Williamson, F.L.S.—"Some Interesting Native Plants."
(Illustrated by lantern views.).

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

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No. 508

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, March 8, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about 50 members and friends were present.

CORRESPONDENCE.

From Hon Sec., A.A.A.S., giving information regarding the next meeting of the Association, to be held in Perth, commencing on August 23, 1926, and inviting this Club to appoint representatives to the General Council. On the motion of Messrs. F. G. A. Barnard and F. Pitcher, Messrs. Coghill, C. Daley and J. A. Kershaw were appointed.

REPORTS.

Reports of excursions were given as follows:—Botanic Gardens, Mr. C. Oke; Black Rock, Miss J. Raff, M.Sc.; Frankston, Mr. A. L. Scott.

Mr. Harvey moved that a vote of thanks be accorded to the Committee for having entertained members at the Botanic Gardens. Seconded by Mr. Pitcher, and carried.

GENERAL.

The President drew attention to some very fine plates depicting the Forest Flora of South Australia, which Miss Hart had presented to the Club, and moved that a vote of thanks be accorded her. Seconded by Mr. E. E. Pescott, and carried.

PAPERS.

1. "Additional Microzoa from the Red Limestone of Grangeburn, near Hamilton, Vic.," by Mr. W. J. Parr.

In the absence of the author, this paper was read by Mr. Chapman, who gave a brief description of the country around the fossil deposit near Hamilton, and referred to the more interesting parts of the paper.

2. "Two Entomologists in the Mallee," by Mr. C. Oke.

The author gave some account of a holiday spent in the Mallee, and referred to many interesting insects which he had found there, notably species found living in the nests of ants.

- Messrs. Coghill and H. B. Williamson and Dr. C. S. Sutton took part in a discussion following the reading of this paper.

NATURAL HISTORY NOTE.

Mr. Daley read a note on a very common garden spider, which he had found sitting on its egg capsules in his garden. He wondered whether the spider was helping to incubate the eggs. Mr. Oke said that the species was known as the Birds'-dropping Spider, *Selena excavata*, and was not assisting the incubation of its eggs, but was, like Mr. Micawber, waiting for "something to turn up."

EXHIBITS:

Mr. F. G. A. Barnard: *Botrychium australe*, Meadow Moonwort. Collected at Oakleigh, about 1888. First exhibited at a meeting of the Club in July, 1892. Now showing new frond, four weeks old.

Mr. J. A. Kershaw: *Ceramodactylus damacus*, Luc. and Frest, from Red Cliffs. A lizard new to Victoria, previously recorded from Central Australia.

Mr. C. Oke: Case of Coleoptera from North-western Victoria.

Mr. E. E. Pescott, F.L.S.: Aboriginal basalt axe, recently collected in the Western District, Vic., made from limestone "flint," showing two grooves for hafting; three "knives" or scrapers, from the same locality, showing secondary edge-chipping.

Mr. A. L. Scott: Hand specimen of pink granite from Mt. Buffalo, Vic. Also micro slide of Mt. Buffalo granite.

NOTE.—Under a low power, using polarized light, it is revealed that the apparently simple rock, granite, is really a very complex structure. Using a higher power, it is seen that, when the quartz, the last to solidify, became solid, it entangled in itself, in the form of innumerable small bubbles, the gases that had not been able to escape, or to enter into chemical combination to form minerals. The degradation of the felspar into kaolin is also shown. In the hand specimen the felspar is identified by its regular outline and its pink colour. The quartz, owing to its transparency, is best seen near the edge.

TWO ENTOMOLOGISTS IN THE MALLEE.

BY C. OKE.

(Read before the Field Naturalists' Club of Victoria,
March 8, 1926)

My friend, Mr. J. E. Dixon, had often told me about the thick Mallee scrub along the railway line between Gypsum Siding and Bronzewing, which he had noted as very promising beetle-country, while returning from his numerous visits to Lake Hattah. So, when he asked me to visit Gypsum for a week or two I was very pleased to accompany him.

Leaving Melbourne by the 5.16 p.m. Mildura train on October 31, 1924, we arrived at Gypsum (274 miles) about 5 o'clock next morning. There is no station at Gypsum, merely a siding for the loading of gypsum, or kopi, which occurs freely in the neighbourhood. On the rare occasions when a lady passenger wishes to alight from the train, a short ladder is produced, but a man has to drop off as best he can.

It was still too dark for us to see our way about, so we sat on our packs and waited—not long—for daylight. What a paradise was revealed at dawn. All around was a dense growth of Mallee and shrubs, including the scrubby Mallee Pine, *Hakea*, *Grevillea* (3 sps.). *Acacia*, *Cassia*, and, in parts, patches of *Calytrix tetragona*, which was blooming to perfection. Bushes with dark-pink and pure white flowers were growing side by side, and, in places, intertwined so that it seemed impossible that any constituent of the soil had helped to produce the colour of the blossoms. Though, where growing on the white sandy ridges, most of the plants had white flowers, an occasional plant having deep pink flowers was met with even there.

We strolled along the railway line, then followed a foot-track into the scrub. We soon came across some *Leptospermum* in flower, and commenced to look for beetles. The first species to be taken was *Stigmodera eldwi*, and soon afterwards *S. elongatula* and *S. vittata* were found. A strong smell was traced to its source—a long-dead fox—which was turned over with a stick. Underneath were two species of Carrion-schafers, *Trox australasiae* and *T. velutinus*, and a pair of that weeping lover of bad smells, *Ptomaphila lachrymosa*. His "tears" are more evident than those of the crocodile, being little, black, raised spots on the reddish wings, which bear a somewhat fanciful resemblance to tears. I had

thought to get some Staphs. on this carrion, but failed to find a sign of them.

Not far from the fox I noticed some ants running across the track, and, as they looked familiar, I picked up one, and at once recognised it by its sweet odour as *Iridomyrmex nitidus*. By following the ants the nest was soon discovered in some sticks and a stump. Lacking a tomahawk, I had to be content with a look around the sticks. However, I was fortunate in finding a nice little Staphylinid, *Dabia nitida*, Lea. This insect, although it closely resembles the other species of *Dabia*, can hardly remain in that genus, as characterised by Olliff, as none of its antennal joints are transverse. As it was impossible to break open the sticks, the direction of the nest was marked on the track with the intention of working it another time. Unfortunately, this was not done, so its treasures remained ungathered.

As accommodation is not procurable at Gypsum, we had brought a tent. A camp site opposite the 274-mile post was selected. This we thought to be the best spot, as it was near the "station," and right in the scrub and collecting ground, but we had to walk a mile for a billy of water. Still, to camp at the "tank" meant to be on cleared paddocks. The drawback in being so far from water was the lateness of morning and evening meals, the midday "snack" being eaten in the scrub, without a drink. Of course, a couple of miles' straight walking is not far, but we persistently took "short cuts" through the Mallee. Here the temptations to delay were innumerable, and the going was very slow. As a matter of fact, some of the best beetles of the trip were taken while we were "running the billy." Perhaps the finest species taken at Gypsum was *Carenidium superbum*, Cast. This is a large black Carab, an inch and a quarter in length, with a decided waist, and having beautiful purple reflections on the upper surface, and greenish around the margins. I caught this beetle while returning with the morning supply of water, and, in the excitement of the chase, upset the billy, and had to return to refill it—about three-quarters of a mile. We had a late breakfast that morning! Another fine Carab, found on the way to the tank, was *Carenum imitator*, Sl. This insect is about an inch in length, black, with pronotum and elytra green. Yet another species, found under a Mallee-root, was a pretty colour variety of *Carenum anthracinum*, Mael. This specimen was black, the elytra with violet and bronze reflections, and a narrow green margin.

On the second evening, while going for water, I turned over a piece of wood, and, seeing that it covered a nest of

Iridomyrmex rufoniger, an ant that is the "host" of many "guests," I searched carefully all around the nest. Very soon I found a small guest. Later I had the pleasure of seeing a second specimen in one of the little runnels of the nest; it had apparently been hiding under some rubbish in the nest, and was now making its way underground. These beetles proved to be the greatest treasures of the trip. They belong to the family Pselaphidæ, but are very distinct from any species known to me in nature or description. I have named the species *Malleecola myrmecophila* (M.S.)—the ant-loving dweller of the Mallee. It is about 2½ mm in length, and of a pale castaneous colour. The head has a number of carinæ, or raised ridges, which divide it into distinct areolets. There is a wedge-shaped projection through the hind margin of the eye, the latter being unusually prominent. The antennæ are eleven-jointed, but the ninth joint, though wide, is so thin, and closely applied to the tenth, that it might easily be overlooked. The prothorax has three longitudinal carinæ and peculiar wing-like flanges on the sides. The legs are also very unusual for a Pselaphid, being flattened sideways and angular, somewhat as in the Histerid genus, *Chlamydopsis*.

While I was getting these new beetles Mr. Dixon found another nest of *Iridomyrmex* under an old bag, and in this several specimens of *Paussoptinus laticornis*, Lea, were found. This species has, I believe, only been recorded as an inquiline of *Iridomyrmex nitidus*, an ant with which I have not found it associated; but we found it here (and also at Bendigo) with two other species of that genus, viz., *I. rufoniger* and *I. gracilis*. Mr. A. M. Lea considers this to be the finest species of Ptinidæ in Australia, and I agree with him. It is a beautiful little beetle, especially when alive, and running around, waving its wide, but flattened, antennæ from side to side, or up and down. It would be tiresome to give the details of each day's work. I say work, for, believe me, we worked. This was no loafing holiday, but a continued hunt for beetles.

The camp was situated on a dull-red, sandy flat, through which shallow trenches had been dug in all directions, in the search for "Kopi," which is whitish, and occurs in "pockets" all over the flat. Gypsum crystals occur in small patches, but not very freely. In all directions sand ridges are seen, some large, others small. A series of ridges, about half a mile on the Brownzewing side, seemed to us to be particularly inviting, and here we spent many delightful hours.

The vegetation around the camp consisted of two species of Mallee, hundreds of very small Murray Pines, with an occasional large one, "Turpentine bush," *Hakea*, *Grevillea*,

Acacia, and that abomination of the Mallee country—Porcupine Grass. This last is a continual source of annoyance when one is collecting, and makes the wearing of leggings almost a necessity. Several times, when chasing flying insects, I came in violent contact with clumps of *Triodea*, some of the points piercing my legs. These points snap off—pieces about one-eighth of an inch in length—and cause irritation of the skin; when fresh, they are rather difficult to remove. The best plan is to leave them for a few hours, when the flesh about them begins to fester. They are then easily pressed out between finger and thumb, and the sores heal as quickly as they developed.

There was a fair amount of animal life on the flat, though it consisted mostly of small insect forms, ants (in particular) and spiders predominating. The exceptions in size were Emus. Several were seen, sometimes together, sometimes solitary. Twice I saw a bird, probably the same one, with chicks. A pair of Butcher-birds, *Cracticus torquatus*, had their nest within a dozen paces of the “station” camp. The young birds were able to fly fairly well, but were just learning the art of whistling, and very amusing they were in their attempts to imitate their parents, breaking off in the middle of a call, and looking around in a startled way, as though afraid of their own temerity. Two or three of them were often to be seen in a large Pine tree, having choral practice, and apparently chiding one another on their vocal powers. Two species of Wren-warbler, not found in the Melbourne district, were to be seen flitting among the scrub, but more often around the *Calytrix tetragona*; they were the Black-backed, *Malurus melanonotus*, and the Purple-backed, *M. assimilis*. The former, a beautiful study in blue and black, was as confiding as its congener, *M. cyaneus*, which is so plentiful in some places near Melbourne. The Purple-backed Wren-warbler, which is so easily distinguished by the reddish patch on the body around the wings, appears to be very shy, and takes flight on the slightest movement near it.

Spiders, as I have already said, were numerous, and trap-doors were plentiful all over the flat. But nearly all of them were owned by Wolf-spiders—Lycosidae. In fact, I succeeded in finding only one belonging to one of the true Trap-door Spiders—Avicularidae—and this was quite small. There are two species of Lycosidae inhabiting trap-door nests here. One is of a dingy grey-brown colour, the other appears (the appearance is entirely due to the hairs with which it is clothed) to be a pretty, silvery-grey, with distinct black stripes. The latter is the more common of the two. It is

amusing to walk quietly around, keeping a sharp look-out for insects on the ground, and see the lids being pulled down by the spiders inside, or, again, just to catch a sense of movement in a certain spot, and rush forward expecting to see some insect, and find—nothing! And very careful scrutiny of the spot, as a rule, is needed to locate the “door.” It is surprising how quickly these spiders race across the ground, jump into their holes, and close the doors behind them. To what cause is this remarkable habit attributable? If it is really a habit developed from the blind instinct of self-preservation, then I certainly think that wasps must have been the enemies most dreaded. But we were too early in the season to see those interesting insects at work.

I found a most remarkable piece of work done by one of these spiders beside the railway line. The gangers had been cutting out some rotting sleepers, and had thrown them beside the line. On turning over one piece I noticed a large female Wolf-spider. She was in a defensive attitude, in a small, round chamber, much as there is at the bottom of a tunnel from a trap-door, but there was no apparent exit. I could detect no means whereby she could leave her retreat, so I carefully replaced the log, and searched all around it for the exit, but still without success. I then raised the sleeper on its side again, and looked underneath. Ah! There it was! Straight over the spider was the pin-hole for bolting down the rail, but, looking up the hole, I noted the light was not visible through it, as is usually the case. So I looked along the top, but failed to see the “door,” and it was only after pushing a twig through the hole and opening the “door” that way, that I could be sure of seeing it. Where the hole had been made, there was a small ridge on the sleeper, and this had been carefully carried across the “door” by the spider. Was this merely blind instinct? Everyone must know, or can imagine, the splintery appearance of an old sleeper. Well, this had been imitated to a nicety, and the Mallee red dust had fallen on it and completed the work of this master craftsman.

Around the camp a few Carabs were taken, including: *Euryscaplus dilatatus*, Mael., *Carcnum cordipenne*, Sl. (one was taken from a burrow nearly three feet in length), *C. elegans*, Mael., *Cerolulus semiviolacea*, Cast., and *Sarticus dixonii* Sl. Beating the flowering Mallee, we obtained comparatively few beetles; still two good species of *Stigmodera* were obtained by this means, *Stigmodera moribunda*, Bl., and *S. signata*. The *Leptospernum*, as usual, proved better, and from it we obtained *Stigmodera vittata*, *elongatula*,

elderi, *octospilota*, *argillacea*, *cyanicollis*, *amphichroa* and *aneicornis*. Of these, *argillacea* is probably the prettiest. with its coppery thorax, which is margined with yellow, the wing-cases pale reddish, with blue markings. It is close to *octospilota* in markings (but not colour) and outline, but the apices of the elytra are distinct, much as in *elderi*. Other beetles taken here were a few Clerids and Malacodermus; among the latter was a new *Hypattalus* (but as it is a female it will have to stand over) and *Metriorrhynchus occidentalis*, Blkb., which was "new" to me. Some beetles occurred in great numbers, particularly certain of the small weevils. Chrysomelids and Anthicids. The Calytrix had very few beetles on it—a few small species that were common on anything; but one pretty exception was *Aonychus hopei*, a beautiful little weevil, with patches of pure white scales.

Each day a visit was paid to one of the sand ridges, and here we did better with the flower-frequenting beetles, especially on the *Leptospermum*, which grows much more freely on the sand ridges than on the flats. From this we took four species of *Melobasis*, viz., *purpurascans*, *fulgurans* (several varieties), *cuprifera* and *gratiosissima*, the majority of the last-named species being very fine, large specimens. *Fulgurans* and *gratiosissima* were both very lively, and it was almost useless to use the umbrella for them, as they flew off almost before touching it; so picking them off the flowers had to be resorted to. A few longicorns were obtained here, such as *Uracanthus albatrus*, *U. discicollis*, *U. strigosus*, U.sp.; *Triticosmia paradoxa*, *Eroschema poweri*, and *Atesta*, sp.

Up on the sand ridges the *Hakea* was coming into flower, and on this we took *Stigmodera jekeli* and *S. robusta* (?) *Stigmodera atricollis* was taken from *Hakea* and *Leptospermum*. From a small *Cassia* I shook three specimens of a weevil "new" to us—*Evas crassirostris*, Pasc., previously recorded from South Australia only. Shrubs of several species were persistently shaken, as it was thought they must produce something; but in several cases without result. A number of young "Ming" trees were shaken in the hopes of getting one of the species of *Curis* that have been taken on this plant, but the only result in each case was a shower of small weevils.

In the big sand-ridge country, half a mile from the Siding, there are plenty of kangaroos, and their tracks were to be seen in every direction. Birds were more numerous here than on the flats, but I do not remember seeing any species that is not known down south, with the exception of the Lowan, *Leipoa ocellata*, and the Crested Bell-bird, *Oreoica gutturalis*. The latter, of course, was heard everywhere. On the edge of

the sand-ridge country were a number of nests of an ant, *Euponera lutea*. They were searched diligently, but did not produce much material. Crickets and cockroaches could have been had in plenty, but a shortage of bottles prevented the collecting of these, or spiders, in any number. The only beetles taken with this ant were *Eupines flavoapicalis*, Lea., *Tmesiphorus formicinus*, MacL., *Rybaxis electrica*, and *Calodera*, sp. While in a nest of a small black *Iridomyrmex* I found a real prize, *Extrephekingi*, described from Western Australia, but previously taken, one specimen each, by Messrs. H. W. Davey and J. C. Goudie, at Sea Lake, Vic. This little beetle belongs to the Ptinidæ, and is of a reddish chestnut colour, with a broad, jointed antennæ. Another good find was the Ptinid, *Polyplocotes carinaticeps*, Lea, in the nest of the ant *Cremastogaster laviceps*. This beetle was also described from Western Australia, and is now first recorded from Victoria. Two other good inquilines that were taken with *C. laviceps* were *Articerus cremastogasleri*, Lea, and *Nepharinus goudiei*, Lea.

In a nest of the Wood Ant, *Iridomyrmex nitidus*, I obtained a species of *Articerus* which I had long wished to possess—*A. constricticornis*, Lea, a small Pselaphid, with a single (visible) joint to the antennæ. This one joint is of a remarkable shape, being constricted in the middle, but the outline varies with the surface and angles from which it is seen. Not far from this nest I took another Pselaphid new to science, *Neopalimboldus goudiei*, Oke (M.S.S.). It is close to *Palimboldus*, but the maxillary palpi differ in being longer, with the joints thin at their base. The male is without armature on the legs, which also is at variance with the described species of *Palimboldus*.

Tuesday evening rain began to fall—a passing shower, we thought—but it was after 8 a.m. next day before we could leave our tent. Steady rain all night, and we had only a light calico tent and our umbrellas. These latter we put up in the tent, and they kept us dry for some time. However, before 10 p.m. I was damp, and an hour later wet! Rain had filled the channels all around the tent, and I thought that we would float off, but morning found us still there, and the sun breaking through the clouds. That evening, as it threatened to rain again, we struck tent and made a camp under a tarpaulin from one of the trucks. It was well that we did so, for rain fell incessantly through the night. We determined to leave Gypsum, and 4 a.m. found us packing up. We caught the morning train for Hattah, which is 36 miles further on. Arriving, we were surprised to find that here

there had been only a light, misty rain, but, as it looked rather threatening, we decided to stay near the station for a couple of hours. I made off down the line to a patch of scrub, and was soon digging out a *Carenum* burrow, whose occupant proved to be *C. elegans*.

Under a small stone I found a nest of *Iridomyrmex* sp., and was fortunate to get two specimens of a new Ptinid, which I have named *Polyplocotes apicalis*, Oke (M.S.). It is rather like *Diplocotes foveicollis*, Oll., in the body, but the antennæ has only 9 joints, and the eleventh is very large. Not far away, in another nest of the same species of ant, I caught two specimens (♂ ♀) of *Diplocotes* (*Decemplocotes*) *strigicollis*, Lea. This beetle has only 10 joints in its antennæ.

About 10 o'clock we started to walk out to Lake Hattah, a distance of 3½ miles. Some very interesting country lies between the Hattah Station and the Mildura Road, and it was only by the promise of a full day along this track (a promise not fulfilled) that I was persuaded not to wander off into the scrub. However, a little collecting was done. The results were rather disappointing, the only beetle worth taking being a specimen of *Belus flindersi*. There is a great variety of vegetation here, and this should be good insect country all the year round, but especially in the early spring, when the various *Acacias* are in bloom. The only shrubs we found in flower were three species of Mallee and *Myoporum platycarpum*. Several bushes of this latter species were shaken into the umbrella, but the only beetles obtained were *Monolepta divisa*, Blkb., *M. modesta*, Blkb., and *Ditropidus apicipennis*, Lea.

It had been arranged that we would stay with Mr. Alf. Jones, a friend of Mr. Dixon, who is the only resident right on the lake, with the exception of Scotty at the pumping station, which supplies water to the railway station and residents in Hattah. When we were there Mr. Jones had his camp almost within a stone's-throw of the water in Lake Hattah. On the other side of the camp Lake Broekie was only a few hundred paces away, and, straight in front, about a quarter of a mile, was Little Hattah. In dry weather they are distinct lakes, but in flood are all joined together.

Around the lakes is a fringe of River Gums, and on the flat between and around Lake Broekie are a few Black Box, but these, like most of the vegetation, seem to be dying out. This is particularly the case with the Hop Bush and the Moonah. Of the latter only a small clump of six or seven fair-sized bushes remain; of the former, not a bush was found near the lakes, and yet both species grew plentifully a few years ago! Is it not the same everywhere? The vege-

tation is killed, and no young shrubs or trees grow to take the place of those destroyed. The beetles collected at Hattah might be divided into four groups: (1) Those taken at the water's edge; (2) those taken on the flats around the lakes; (3) those taken out in the Mallee scrub; and (4) those taken in ants' nests.

Naturally enough, after the dryness of the Gypsum sand-ridges, the water attracted us at Hattah, and we spent our first day as well as several half-days there. As was expected, the most numerous in species and individuals of the beetles were Carabs. Some kinds well known around Melbourne were among the most abundant here, viz.: *Platynus marginellus*, Er.; *Chlenius australis*, Dej.; *Mecyclothorax ambiguus*, Er.; and *Catadromus lacordairei*, Boisd. Other species common enough here, but unknown in the Melbourne district, were *Rhytisternus limbatus*, Mael.; *Chlaenioidius mellyi*, Montry.; *Pheropsophus verticalis*, Dej.; *Catadromus latro*, Tsch.; and *Bembidium jacksoniense*, Guer., while only one or two specimens of the following were taken: *Euthenarus morganensis*, Blkb.; *Amblystomus ovalis*, Sl.; *A. parvus*, Blkb.; *A. lactus*, Blkb.; *Mecyclothorax curtus*, Sl.; *M. punctatus*, Sl., and *Loxandrus australiensis*, Sl. A few Staphylinidæ were taken along the water's edge, including *Alcochara semirubra*, Fol.; *Philonthus subcingulatus*, Mael.; *Thrycecephalus chalcopterus*, Erichs., T., sp., nov.; *Pinophilus univentris*, Fol., 5 sps. of Lathrobium, 5 sps. of Symbalium, and *Domene torrensensis*, Blkb., not hitherto recorded as Victoria. Water-beetles were scarce, and only four sps. of Hydrophyllidæ were obtained. Pselaphidæ also were scarce, and only four species were taken: *Eupinoda* sp.; *Ctenisophus longicornis*, Lea., and two other undetermined species.

Several of the forms mentioned were found only at one point—on Lake Brockie—where mild flood conditions existed. Had we collected at this point on our first day we would probably have done much better than we did. As it was, we tried for a while on the second day, and gave it up as the day was too windy. I did not try there again until the day before we left, and by then the beetles were considerably reduced in numbers. I think this was due, principally, to the number of Geckoes and Scorpions that had concentrated around this spot. Every stick or piece of bark seemed to be harbouring at least one scorpion. Under one piece of bark, about 18 inches in length and five or six inches in width, there were seven of them. They were a fairly small species, of a dingy, yellowish colour, variegated with black spots, and were probably *Isometrus maculatus*, De Geer.

In the next group—those taken on the flats—Carabidæ was well represented here also. The largest species found

was *Philoscaptus tuberculatis*, Mael. This is a very fine insect, $1\frac{1}{4}$ inches in length, jet black, with rows of small tubercles on the elytra. The jaws are very powerful-looking, and the front legs are well adapted for digging. It is usually found sitting in the entrance to its burrow, which is only four or five inches in length, under logs. Two specimens of *Geoscaptus cactus*, Mael., a brilliantly-polished species, somewhat like *Carenum scaraphites*, Westw. Undoubtedly the most showy Carab we found here was *Eutoma tinctillatum*, Newm., of which we secured several specimens in two distinct sizes—20 mm. and $14\frac{1}{2}$ mm. Looked at from one angle these specimens are of a beautiful violet hue, but when seen from another angle they appear a bluish-green.

The rarest find in Carabs for the trip was *Trichocarenum castelnaui*, Sl., a single specimen of which I found sheltering under a chip of wood—without a sign of a burrow. This interesting species was described as from Roebuck Bay, Western Australia, from a single specimen in the French collection, and my specimen is, apparently, only the second one to be taken. A specimen of *Mecyclothorax lateralis*, Cast., was taken under some rubbish, as also were some *Simondontus mandibularis*, Sl. Two species of Paussidæ were taken—*Arthropterus wilsoni*, Westw., and *A. westwoodi*, Mael.—under cover on the ground, but never in ants' nests. The latter species was not uncommon, and one was taken in the scrub, two miles away from Lake Brookie. A few interesting species of Tenebrionidæ were found occurring on these flats, including species of *Pterohelæus*, *Helæus*, *Saragus* and *Adelium*, *Hypaulax orcus*, Pasc., and several species of *Chalcopterus*.

Another good "find" I made here consists of a pair of *Metriorrhynchus apterus*, Lea. They were taken on a log, and on opening up the log several pupæ were obtained. Unfortunately these did not emerge properly. This interesting insect is, as its name implies, wingless in the ♀. The ♂ is, I believe, still undescribed. I obtained a single ♂, which may belong to this species, as it was taken near this log, but it is winged. This species was described as from the Darling Downs, in Queensland, and I am not aware of its having been taken elsewhere, so this is an interesting extension of its habitat.

The Black Box was well worked, and several nice weevils were obtained from it, including *Oxyops bilunaris*, *O. alphabetica*, Lea., *O. sp.*; *Bryachus squamicollis*, Pasc.; *Rhinaria tibialis*, Blkb.; *Haplonyx spenceri*, Gyll.; *H. fasciculatus*, Bok., and a variety of *H. sp. nov.*—structurally near *longipilosus*, Lea. The River Gums were much too high for us

to discover what might be on the foliage, but every piece of loose bark within reach was stripped off. The only beetle that was at all common here was *Diphobia familiaris*, Oll., and they were both with the ants and under bark, or on the ground by themselves. A few Carabs were taken, but very sparingly—*Adelotopus cylindricus*, Ch.; *A. aphodioides*, Westw.; *A. micans*, Blkb.; *Sarothrocrepis saavis*, Blkb., and *Anomotarus minor*, Blkb. Amongst other families were a Clerid, *Lemidia rufa*; a Chrysomelid, *Monolepta arida*, Lea., and a Ptinid, *Ptinus* sp., near *medioglaber*, Lea.

Only three trips were made back into the Mallee scrub proper one being to some large sand ridges about two miles away; the second, around and beyond the pumping station and out onto the Mildura road; and the third to some paddocks that had been "rolled," and then left. This latter was a most interesting day's collecting. As the morning was bright and warm, an early start was made, the way being over the undulating land, covered with white everlastings, towards the Mildura road, up the slope to "Wilson's Selection," through the Pine and Bull Mallee belt, and on into the scrub. Though the idea was to get to the rolled paddocks as quickly as possible, and not to loiter on the way, we had not left the camp three minutes before a log was noticed that had not been turned over, and, of course, we could not resist the temptation of having a look underneath it. And so it continued. A specimen of *Eutoma tinctillatum* under one log, a *Helacus* under another; perhaps a Termite's nest, or a nest of some ant would be revealed and searched through for "guests." Here, in a Termites' nest, I found a few specimens of an apterus Staph, belonging to the sub-family Aleocharinae, which, Mr. Lea informs me, is vivaparous. It is a pretty little thing when alive, with its head, prothorax and elytra a dark wine colour, and the abdomen and appendages much lighter. It is very quick in its movements, and is apparently on the best of terms with its hosts. It is probably new to science, but has not yet been fully worked out.

On the rise are some Myalls, and from these a few weevils were obtained, while the leaves underneath were smothered with a small species of ladybird. Every few steps there was something to do: a log to be turned; some bark to be stripped; some boughs on the ground to be shifted; or some bushes to be shaken into the umbrellas. That nothing may escape being taken, a collector has to try everything, and every way he can think of. Here, and in other parts, we found quantities of a Mallee in flower, I believe, the Yellow Mallee, *E. incrassata*, on which hardly a beetle was to be found. The Mallee in question has large clumps of flowers, which are of

a decided yellowish colour, and the individual flowers, as also the leaves, are rather larger than usual. The flowers emit a strong, overpowering smell of honey, and, after beating a quantity into the umbrella, the inside surface becomes so sticky that it is necessary to wash the umbrella. And yet hardly a beetle, or bee, will go near the plants. I do not know the reason, but there must be something unpleasant in the taste of the nectar.

Shaking the shoots around the stumps of some Bull Mallee we obtained some nice Chrysomelides, *Cryptocephalus metallica*, Lea; *C. scabrossus*, Oliv.; var. *rugifrons*, Chp., *C. sp.*; *Cadmus histrionicus*, Chp., and a few species of *Paropsis*. While shaking a clump of shoots I obtained a pair of small weevils that I thought were "new" to me, and I spent over half-an-hour trying to get more, but only obtained one. Imagine my disgust when, later, I found that they were only the Grain Weevil, *Calandra granaria*! From a young piece of the white Mallee I obtained the green caterpillar of the rather rare moth, *Hyleora eucalypti*, and this was subsequently bred out. What a change in colour! The caterpillar is a beautiful eau-de-nil with a white stripe down the sides, the pupa black, and the perfect insect is a fine study in browns, which, on the forewings, are intricately interwoven; the hind wings are pearly white with yellow-brown margins.

On reaching the "rolled" Mallee we tried everything, though the "spring-backs" were our main objective, and, from these, we obtained some beautiful species of *Paropsis*. But how disappointing these beetles are! One we caught was a large species of a beautiful soft shade of green. Within a month it was a dingy yellow. Another with a green band around it, and red and golden markings faded too. It is a great pity that these beetles will not retain their colours. Here we obtained *Pterohelacus thymaloides*, Mael., and three species of Longicorns—*Attestra angasi*, *Bebius filiformis*, and *Ischnotes bakewelli*. By one o'clock the sand had become so hot that it almost burnt the hand when touched. We decided to have lunch. For a drink we went over to Wilson's tank. It contained only a few inches of mud, so we selected the nearest approach to a shady spot that was to be found, and lunched without water.

A few stunted *Myoporums* and a little White Mallee were the only flowers we found on resuming work after lunch. On the former were a few *Anilaria*, and a single *Pseudoanilaria purpuricollis*, which may be its usual time here, but some that we bred out of sticks at home did not appear till February. The *Leptospermum* was just about finished at Hattah, and what little was left had very few

Stigs. on it, and only one was added to our list—*Stigmodera gibbicollis*, Saund. About 4 p.m. a start was made for camp, and, striking through the scrub, we returned by a different route. On the edge of the scrub I took a specimen of that very interesting longicorn—*Microtragus mormon*, Pasc. This longicorn looks very like one of the short-snouted ground weevils that has grown long antennæ.

The fourth group of beetles—those taken in ants' nests—provided more interest and took longer to catch than might be thought by taking a casual look at our "catch." For though they are mostly small, there is usually something of special interest in each species. For example, take *Thorictosoma tibiale*, Lea, of which I collected a few specimens in nests of a small black *Iridomyrmex* in the sand-ridge country. This beetle, which is $2\frac{1}{2}$ mm. in length, belongs to the Tenebrionidae, is without eyes and wings, and yet ranges from Geraldton, W.A., to Hattah and Natya, in Victoria.

Out in the sand-ridge country I obtained a few more specimens of *Malleocola myrmecophila*, *Diplocotes strigicollis*, *Polyplocotes apicalis*, and another very interesting Ptinid, belonging to the Ectrephini, for which a new genus, or subgenus, will have to be created. And as the antennæ have only two joints, the second being wedge-shaped, I have called it *Bitrepes cuneiformis* (M.S.S.). I consider this to be one of the most interesting species of Ptinidae known in Australia. Though it might be a moot point whether the broadening of the joints—as in *Paussoptinus*—or the reduction of the joints from the usual eleven to two, as in the present species, is the more interesting. An intermediate position is occupied by *Ectrepes kingi* having the broadened antennæ, but only five or six joints. *Articerus* were scarce at Hattah, but two specimens (δ $\text{\textit{f}}$) of *A. dentipes*, Lea, were found with *Iridomyrmex rufoniger*, and several specimens of another species, not determined yet, but certainly new to Victoria.

On starting for this trip I determined to try to obtain two beetles that had been collected in North-western Victoria—*Pheidoliphila carbo*, taken at Sea Lake from a nest of Pheidole, and *Camponotophilus fimbriicollis*, described from Beverley, W.A., of which Mr. Dixon had already obtained two specimens in nests of the common Sugar Ant, *Camponotus nigriceps*, at Hattah. Of the first, no sign was seen, though no effort was spared. Pheidole Ants were rather scarce, but those nests found were looked over most carefully and revisited several times.

Hunting for the second species proved the most interesting item of our whole programme. The ants swarmed over everything all around the lakes, and every bit of cover that

did not have a nest of some other ant under it, had a nest of these Sugar Ants, but it was not till the fourth day of our visit that I succeeded in finding one of the beetles. I had looked in 236 nests without finding a specimen! When I say nests, I do not mean that all were separate colonies. For instance, two pieces of bark lying on the ground, say a few feet, or even less, between, and covering numbers of these ants and the tunnels leading down to their nests, would show on the surface, no connection whatever, but underground would almost certainly be linked. Yet I would have counted these as two nests. And, again, some nests were looked in twice, a few three times, and these visits were counted in. However, on turning over a piece of wood, and exposing my 237th nest (we had both looked in this nest, but on different occasions), I was at last rewarded by seeing one of the long-coveted beetles.

Camponotiphilus fimbriicollis, or, to give it its English equivalent, The Fringed-neck beloved of the Sugar Ants is a dark-reddish, chestnut beetle, slightly under half-an-inch in length, with a fairly conspicuous fringe of pubescence around the pronotum. Victorian specimens are slightly larger than the only two specimens I have seen from Western Australia. Mr. Lea gives the length as $8\frac{1}{2}$ - $9\frac{1}{2}$ mm.; my examples are $10\frac{1}{2}$ -11 mm. That the beetles live on very friendly terms with their hosts there can be little doubt, as the ants made no attempt to molest them. When nests are opened, the beetles are very lively, and immediately make for the tunnels. In their hurry often they will try to run between the legs of their hosts, resulting in the ants coming "croppers," which the ants apparently take in the spirit of "no offence meant." The ants often get out of the way of the beetles, and seem as anxious as the beetles themselves are to get out of sight.

Twice, on finding one of these beetles in a nest, and noting which hole it was making for, I plugged the hole, an inch or two down, with my trowel. The beetle dived into the hole, but could not get down, and then there was excitement! Several ants rushed into the hole, pushed their way around, came out, looked around, as though for fresh inspiration, and then rushed back again. Did they push the beetle out? Or did it come out of its own accord? On the first occasion I thought the beetle rushed out of its own free will; it ran towards another hole, when I picked it up and put it in the killing-bottle. On the second occasion it appeared to me that the beetle was forced out by the ants and directed towards another hole, in much the same way as a dog will drive sheep. Only, instead of one dog and many sheep, it was several ants and one beetle. I tried to

PLATE VIII



ALPINE HEATH, *Epacris Baobabensis*, Stapf.

THE BAW BAW BERRY, *Wittsteinia vacciniacea*, F.v.M.

(Negatives by F. J. Bishop)

block the second hole, but the beetle was too quick for me. I tried to dig it out, but, on digging a small hole, such a labyrinth of passages were exposed that I was at a loss which way to proceed, and, as the clay was very hard for a trowel, I gave it up.

The time spent on opening the nests, before the first "Fringe-neck" was found, was by no means lost. Far from it! For other inquilines were seen and noted. Two other beetles were seen in the nests. One was a Staph., belonging to the genus *Conosoma*, but, as some specimens were obtained away from the nests, they may not be true inquilines. The second was a "new" Pselaphid, since described as *Tmesiphorus camponoti*, Oke. This species was not uncommon, but not many were taken, as I mistook it, in the field, for *T. formicinus*, Mael.

An unexpected guest to me, if not the ants, was a pretty little bluish spider, belonging to the family Attidæ. Numbers of this spider were seen by both of us, but neither saw one outside of the Sugar Ants' nests. Several kinds of mites were noted, and a small yellowish fly was not uncommon. But the most interesting and peculiar guest was a kind of Froghopper (Cercopidæ). All the species of this family hitherto known to me live on bushes, principally young Eucalypts, and live on the juices of these plants. Two species of this family, *Eurymola distincta*, Sign., and *E. rubrovittata*, Am., are very common on young Eucalypt trees, where they are always attended by ants, particularly the Sugar Ants and Meat Ants, *Iridomyrmex detectus*. But we found this species living in nests under the ground, and, from what we saw, it seems very doubtful whether they ever leave the nests, except, perhaps, to change from one to the other. The insects were found in all stages, except the eggs. Little larvæ from slightly more than 1 mm. up to fully matured imagoes were seen in the same nest, and the ants guarded them so carefully it would appear that they spent their lives in these nests—unless they are taken out at night to feed on the trees. Unfortunately, our acetylene lamp was damaged, being dropped off the train at Gypsun, and I was unable to do much observation work at night. I did glance around one or two nests at night, but did not see any froghoppers outside them.

That these froghoppers are used to being carried by the ants is evident. On rolling over the covering log from one of the nests sometimes a dozen or 20 of these guests will be revealed. They seem to be greatly agitated, and quite unable to make up their minds which way to run. Any ant meeting one of the guests will immediately seize it by the thorax and carry it down one of the holes. Or, if the

guest had been on the log, the ant would take it into any crack or crevice and hide it. The ants invariably carry the froghoppers off head foremost, and generally turn them over with their feet uppermost as soon as they take hold of them; if they do not, the froghoppers will force themselves over in the ants' mandibles. The reason for this is easily understood—it is because the froghoppers' claws catch in everything when turned down, but are not nearly so likely to do so in the reversed position. Did the ants of the froghoppers discover this fact first?

I greatly regret that I did not bring home many live specimens of ants and their guests. One might have been able to discover more about them, though I am afraid it would be necessary to have them in their natural surroundings to see some of the interesting details. It may be possible to learn whether the froghoppers are fed by the ants. I dug out one fine nest (covered by a log and a sheet of bark about 5 feet in length and 2 feet in width) to a depth of over 3 feet to see whether the guests could be obtained far down in the nest. As I had taken one "Fringe-neck" in this nest, I had hopes of finding more specimens of this beetle down in the nest. I was disappointed, but right at the bottom of the hole obtained one of the spiders and several froghoppers.

We brought back with us a bundle of sticks, and from these bred a few longicorns, including: from Mallee, *Scolecobrotus variegatus*, Blkb.; from Acacia, *Symphyletes lateralis*, Pasc., *S. vestigialis*, Pasc., *Platyomopsis obliqua*, Don.; and from Black Box sticks, *Atesta angasi*, Pasc., *A. tatei*, Blkb., and *Atesta* sp. nov.

It was hard to depart from this delightful country, with its many interesting phases of animal life, but business demanded that I should return to the city, and so we had to make an early start on Saturday morning to catch the train at 8.22 from Hattah. Arriving at the station with a few minutes to spare, I had time to try a few pieces of *Myoporum platycarpum*, which were out to perfection, and from which I obtained a single specimen of *Neocuris discoflavum*—my last catch for the trip.

Altogether 364 species of beetles were taken, and I believe a few common species were passed over; but still I think we obtained a very fair number for 14 days' collecting. I am greatly indebted to Mr. A. M. Lea for identifying and checking my identifications of a number of the beetles obtained, and to Mr. T. G. Sloane for identifying many of the Carabidae and the Paussidae. To both I tender my best thanks.

TWO RARE NATIVE MOUNTAIN HEATHS.

By EDWARD E. PESCOTT, F.L.S.

The heaths which we usually grow in our gardens are either species or hybrids of the native South African heaths, and belong to the family of Ericaceæ, the members of which are often called the "true heaths." The heaths which make the Australian bush and moorlands so gorgeously beautiful in winter and spring belong to the family of Epacrideæ. There are several botanical differences in the families, the main distinction between the two being that in Ericaceæ the anthers are always one-celled, and in Epacrideæ they are always two-celled. Representatives of both families are found in Victoria, but, while we may find more than 50 species of Epacrideæ, there are only two native species of Ericaceæ.

BAW BAW BERRY (ERICACEÆ)

The species illustrated, *Wittsteinia vacciniacea*, F.v.M., is known as the Baw Baw Berry. It is found only on the tops of the Baw Baw and adjacent mountains, and is therefore very rarely seen by plant lovers. A wood-block figure of this plant is given in Mueller's "Key," but it is very formal, and hardly shows the true character of the plant. The bushes grow to a height of two feet or three feet, and the delicate, greenish-white, waxy bells are exceedingly dainty. Unfortunately, the plants were not fruiting at the time the photograph was taken; the fruits are small, greenish-yellow or reddish in colour, and are classed as edible.

To the Ericaceæ belong the blue berries, huckleberries, and other edible berries so common in North America; they yield large crops of berries annually.

THE ALPINE HEATH (EPACRIDEÆ)

Epacris Bawbawensis, Stapf, for many years was classified as *E. heteronema*, Labill., and under that name is described at page 378 of Mueller's "Key." It is purely alpine heath, growing fairly abundantly on the Baw Baws, becoming quite a tall plant, having white flowers crowded towards the top of the branchlets, as shown in the photograph. The localities of *E. heteronema*, as given in the "Flora Australiensis," page 239, are not only the Baw Baws, but Mount Aberdeen and the Mitta Mittas; records also showing it to occur in Tasmania and New South Wales.

In 1909, when studying a heath that had flowered at Kew Gardens, England, one of the botanists, Mr. O. Stapf, came

to the conclusion that *E. heteronema* was a very ill-defined species, especially as Bentham had stated that *E. dubia*, Lindl., might be a variety of this species.

As a result of Mr. Stapf's investigations, it was found that, while *E. heteronema* was a valid species, the Baw Baw specimens differed very considerably from the type description. Indeed, from all the plants known as *E. heteronema*, four separate species were described, the determination resulting in the exclusion of that species from Victorian Flora. The Buffalo and Mitta Mitta specimens were named *E. breviflora*, Stapf; the Tasmanian form was named *E. Stuartii*, Stapf; while the Baw Baw plant was named after the mountains on which it grows. This species was published in the Kew Bulletin of 1910, and its only locality is the Baw Baw Mountains.

The main differences between the two plants may here be noted for the use of the general collector. In *E. heteronema* the style is as short or shorter than the ovary, and it does not protrude from the mouth of the corolla; while in *E. Bawbawensis* the style is several times longer than the ovary; it is distinctly protruded from the mouth or funnel of the corolla tube. In the former the filaments which support the anthers are very much shorter than the anthers; while in the latter the filaments are much longer than in the former.

In the photograph reproduced, the protruding style can clearly be seen in the centre of some of the flowers.

The illustrations are from negatives by Mr. F. J. Bishop, whose beautiful photographs, which so truly delineate the characters of the native flowers, are widely known.

THE PROVIDENCE OF A THRUSH.

We often read of animals laying food aside for future needs, but I do not remember hearing of any bird doing so. Nevertheless, I once saw a Grey Shrike-Thrust, *Colluricincla harmonica*, thus provide for himself. The friendly bird came every day to our verandah for crumbs, and once, having evidently satisfied his hunger for the time being, he picked up a piece of bread, and, carrying it to a post near by, carefully pushed it under the edge of a sack which was hanging there. Fortunately, I happened to go to the door, just as, later in the afternoon, the Thrush returned for his food. Without hesitation, he flew to the post, and picking his bread from beneath the edge of the sack, he flew off with it. On another day he carefully pushed a large crumb into a cleft in a log. I did not see him return, but a few hours later the crumb had gone, and presumably he had taken it.—
J. GALBRAITH.

REGENERATION OF BURNT FOREST.

No records appear to have been published in this State of the effects of fires on our various types of forest, and of the measure of regeneration which has followed. The results of the many fires which have periodically devastated our timber resources are doubtless known to Forest officers, but nothing of a systematic kind has been made available for public information.

It is, of course, generally known that a forest suffers according to the nature and intensity of the fire and the kind of tree, or trees, and attendant species composing it. It is known, too, that the result of a fire, even if the trees are not killed, is to render them more vulnerable to borers, fungi, and other destructive agencies; that the humus is destroyed and the ground bared, with the consequent denudation of the soil by rainfall when the slope is great enough, to the detriment of both the forest and the streams draining it; that the constitution of the forest is invariably altered more or less, certain species being killed outright and afterwards replaced by wattles, bracken or others dubbed "fire-weeds."

To remedy, in some slight measure, this lack of exact information, it is proposed that two burnt areas, differing, if possible, in the nature of the cover, shall be selected for purposes of periodical observation and record by a team composed of members of the club.

In the first place, surveys of the burnt areas would need to be made, the immediate effects of the fire, the nature of the surface and the soil, the presence or not of humus, the altitude, slope and exposure, and the fauna and flora still existing noted. The date of the fire, and the dates and amount of the precipitation occurring in the interval, would be ascertained, and any evidences of regeneration recorded.

By an examination of areas adjoining the burnt area, its condition anterior to the fire would be ascertained, and a list of its fauna and flora drawn up with a reasonable degree of approximation. Subsequently, monthly visits by one or other member of the team might be paid, their observations being duly recorded, generally for the whole area, and particularly for certain specially selected quadrats.

The Botanical Department of the University of Melbourne has the intention to carry out similar work in the vicinity of Healesville, and our members will doubtless be glad to adhere to whatever scheme is adopted by it, and work on similar lines.

With the view of seeking suitable areas for the purpose mentioned, two members of the Club visited Upper Ferntree Gully on February 28, and provisionally fixed on one close to the station, which had been fire-swept on the 13th of the month. This measures roughly between 20 acres and 30 acres, and is bounded by three roads—that from the main road to the Pavilion; from there towards Ferny Creek, and the third, down which a telegraph line runs, joining these. With the exception of a small patch near the apex of the triangle, the scrub has been completely burnt, and a cursory examination enabled only *Goodenia ovata*, *Acacia verticellata* and *Glycine clandestina* to be identified.

Of the trees, *Eucalyptus elwophora* largely predominated, and *E. obliqua* and *E. australiana* were also present. Although all their leaves were dead, none of the trees appeared to have been killed, and these will doubtless recover, their bark having been only superficially charred. Already signs of recovery were evident in many of them in the shape of adventitious shoots at the bases of saplings and along their stems. Other signs of life were noticed in the tussocks of *Gahnia*, sp., and *lepidosperma*, sp. The fire had, seemingly, been insufficiently severe to consume the many logs which strewed the forest—perhaps relies of previous fires—and under these were occasional lizards, and numerous spiders, ants and froghoppers still alive.

The work proposed by the committee and the Botanical Department of our University will be a small step in the application of plant ecology to practical use. All whose business it is to grow things, be they forest trees, fruit trees, grain or other crops or pasture, put the principles of plant ecology into practice to a greater or lesser degree. Mostly, like the man who was surprised at finding he had been talking prose all his life, they are doing so quite unconsciously. They work empirically or by rule of thumb. Many succeed in spite of this, but it is very certain that, if they clearly understood the factors responsible for the growth of their crops, and the influences which militated against them, their success would be the greater.—C.S.S.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

PART III.

Family POLYPODIACEÆ.

Key to the Genera.

- (a) Sori marginal
 - (b) Indusium absent Notholaena, 1 sp.
 - (b) Indusium present, sometimes not apparent on the old fronds
 - (c) Indusium short
 - (d) Indusium cup-shaped, opening outwards
 - (e) Fronds firm Davallia, 2 spp.
 - (e) Fronds tender Dennstaedtia, 1 sp.
 - (d) Indusium formed by the incurved margin of the frond
 - (f) Fronds 4 to 5 ft. Hypolepis, 1 sp.
 - (f) Fronds under 1 ft. Cheilanthes, 1 sp.
 - (d) Indusium an incurved reniform membrane developed from the edge of the frond, but distinct from it Adiantum, 4 spp.
 - (c) Indusium elongated
 - (g) Indusium opening outwards Lindsaya, 2 spp.
 - (g) Indusium opening inwards
 - (h) Indusium double Pteridium, 1 sp.
 - (h) Indusium single
 - (i) Fronds dark green on both sides
Pteris, 4 spp.
 - (i) Fronds paler beneath
 - (j) Fronds bi- or tri-pinnate, 2 to 4 ft.
Histiopteris, 1 sp.
 - (j) Fronds simply pinnate, 1 ft.
Pellaea, 1 sp.
- (a) Sori away from the margin
 - (k) Indusium absent
 - (l) Fertile and sterile fronds dissimilar
Cyclophorus, 1 sp.
 - (l) Fertile and sterile frond similar
 - (m) Sori linear, along veins, very hairy plant
Pleurosorus, 1 sp.
 - (m) Sori covering most of the veins, fronds glabrous, very thin Anogramma, 1 sp.

- (m) Sori roundish, fronds entire or pinnatifid
 - Polypodium, 4 spp.
 - Fronds repeatedly pinnate
 - Dryopteris punctata (see below)
- (k) Indusium present
 - (n) Sori elongated
 - (o) Sori in a continuous line along both sides of the midrib Blechnum, 9 spp.
 - (o) Sori along veins diverging from the midrib
 - Asplenium, 8 spp.
 - (n) Sori oblong linear, parallel to the midrib on veinlets connecting forked veins Doodia, 2 spp.
 - (n) Sori shorter, slightly curved, mostly at the forks of veins diverging from the midrib, fronds very tender, 3 to 5 ft. Athyrium, 1 sp.
 - (n) Sori roundish
 - (p) Indusium peltate Polystichum, 4 spp.
 - (p) Indusium attached at the base (absent in D. punctata) Dryopteris, 3 spp.
 - (p) Indusium ovate, with sori attached to base, 6 to 9 inches Cystopteris, 1 sp.

Genus NOTHOLÆNA (Page 301).

NOTHOLÆNA DISTANS, R.Br. (Fig. I). Bristly Cloak Fern, W.A., S.A., V., N.S.W., Q., P. (Polynesia), N.Z. Fronds 3in. to 10in., with distant pairs of pinnæ (Ib) densely covered with long hairs underneath, almost concealing the sori, which form a continuous line along the margin.

In the young state the margin may be somewhat curved over the sori. This species is not often gathered, but, since the *Census of Victorian plants* was compiled, specimens have been seen from Wodonga and Broken River (N.E.), Macalister River, and recently Mr. D. J. Paton collected it on granite rocks on Big Hill Range, Bendigo (N.W.).

Genus DAVALLIA (Page 301).

DAVALLIA DUBIA, R.Br. (Fig. II). Rainbow Fern, T., V., N.S.W., Q. Very widespread in Victoria. Fronds large and firm, resembling the Common Bracken, but less rigid. Fig. IIa shows a secondary pinna. Sori are at the base of the blunt teeth, which are often in age curved over them like those of *Dicksonia* (IIId), but there is no upper valve as in that genus. The indusium is attached by a broad base to the pinnule, and does not cover the sorus (IIe).



I—*Notholaena*; II, III—*Davallia*; IV—*Dennstaedtia*;
V—*Hypolepis*; VI—*Cheilanthes*.

DAVALLIA PYXIDATA, Cav. (Fig. III). Hare's-foot Fern, V., N.S.W., Q., P. This is a smaller and more tender fern, up to 1 foot in height, and may be distinguished from *D. dubia* by its indusium being a complete cup or cylinder, longer than broad (IIIc), when young almost immersed in the pinnule. There appears to be only one Victorian specimen in the National Herbarium—that from the Grampians. It has been recorded from East and South, and specimens would be acceptable at the Herbarium.

Genus *DENNSTÆDTIA* (Page 301.)

D. DAVALLIOIDES (R.Br.), Moore (Fig. IV). Creeping Lace Fern, V., N.S.W., Q., As., N.Z. This is a beautiful fern with tender, much-divided fronds, up to 5 feet, springing from a rhizome, like bracken. It has its spore cases in a cup-shaped involucre with almost entire edges set at the base of the upper sides of the very small teeth of the pinnules (IVbc). It is common in the jungle-like creek bottoms of East Gippsland, and there are specimens from Johanna River, near Cape Otway.

Genus *HYPOLEPIS* (Page 301).

HYPOLEPIS TENUIFOLIA (Forst.), Bernh. (Fig. V). Soft Hypolepis, V., N.S.W., Q., As., P., N.Z. This fern bears a remarkable resemblance to the common *Dryopteris punctata*, and, when the indusium has withered, can scarcely be distinguished from that fern. It has fronds springing from a rhizome to a height of 4 or 5 feet, somewhat resembling *Davallia dubia*. The sori are at the edge of the pinnules, between their teeth, and the indusium consists of the reflexed scale-like margin of the pinnule (Vbc), at first often covering the sorus, but at an advanced stage almost concealed under it, or quite withered away. There are specimens in the Herbarium from few Victorian localities; "Curdie River," "Otway," and "Raymond Creek."

Genus *CHEILANTHES* (Page 301).

CHEILANTHES TENUIFOLIA (Burm.) Sw. (Fig. VI). Rock Fern, all States of Australia, As., P., N.Z. This species is found in all parts of Victoria, and is sometimes seen thickly spread over granite hillsides under conditions which one does not usually associate with ferns, with the exception of the Bracken. The fronds grow to almost a foot in height, and the edges of the pinnules are revolute to form a cover for the sori, which are sometimes contiguous, with the small rounded teeth or lobes bent over them.

Genus ADIANTUM (Page 302).

ADIANTUM ÆTHIOPICUM, L. (Fig. I). Common Maidenhair, very widely spread through every continent and the islands of the Pacific. Although found growing under ordinary conditions in scrub land, it is a favourite on account of its fairy-like appearance, due to the capillary stalks of the pinnules. It is the only one of the four species which has its pinnules not dimidiate (obliquely set on the stalks). It belongs to a section containing the old-world *A. capillus-Veneris*, "True Maidenhair," which has been erroneously recorded for Victoria in Supplement 3 to the Census owing to an error in determination by the late Prince Bonaparte of specimens of Victorian forms of *A. æthiopicum*. Illustrations of the pinnules of *A. capillus-Veneris* are given for comparison (IIab). It will be noticed that the pinnules are rather deeply lobed, and that the indusium extends further along the edge than in *A. æthiopicum*.

A. FORMOSUM, R.Br. (Fig. III)| Giant Maidenhair, V., N.S.W., Q., N.Z. The fronds are large—up to 3 feet—with shiny black stems, while its pinnules are almost leathery, finely streaked, and minutely toothed at the upper edge. Its secondary pinnæ have hairy stems. It is found only in East Gippsland, where it grows thickly on periodically-flooded river alluvial. The author has gathered it at Cann River.

A. HISPIDULUM, Swartz (Fig. IV). Rough Maidenhair, V., N.S.W., Q., and all other parts of the world, except Europe. This fern also has been gathered only in East Gippsland. Its fronds are pedate (foot-like), having a fancied resemblance to the foot of a bird, instead of being pinnate, as in the two latter species. The pinnules are distinctly dimidiate, closely set, finely toothed, and hispid with short hairs on the under-surface. It has been collected only in the extreme East, Genoa River (Rev. A. J. Maher) and Cape Howe (C. Walter).

A. DIAPHANUM, Blume (Fig. V). Filmy Maidenhair Fern, V., N.S.W., Q., As., N.Z., P. The fronds are pedate, under one foot, as in the last species, from which it can be distinguished by its membranous pinnules, fewer sori set deeper from the edge, and the few minute black setæ (stiff thorn-like hairs), on the longer edge of the pinnule. This last is quite a characteristic feature. It is remarkable that this fern has been collected only once in our State, and that within 50 miles of Melbourne—Lang Lang River, 10 miles west of Drouin. (C. French, senior, 1884.)

Genus LINDSAYA (Page 302).

LINDSAYA LINEARIS, Swartz (Fig. VI). Screw Fern, all States of Australia; P., N.Z. This little fern is common among scrub near Melbourne, especially in damp, sandy soil. Its sterile fronds (a) growing usually 6 inches to 8 inches in height, are simply pinnate, the pinnæ being fan-shaped and opposite. The fertile fronds (b) have sori in a continuous line under an indusium opening outwards on the outer edge of the segment. These fertile segments are often found folded or screwed up, hence the vernacular "Screw Fern."

L. CUNEATA (Forst), C. Chr. (Fig. VII). Wedge Fern, Tas., V., N.Z. The fronds are 6 inches to 8 inches in height, bipinnate, with pinnæ about an inch long obovate or cuneate, having sori and indusium much like those of *L. linearis*. This fern was unrecorded for Victoria until Messrs. Audas and St. John collected it near Sealers' Cove, Wilson's Promontory, in October, 1909.

ADDITIONAL NOTES.

TRICHOMANES CAUDATUM, Brack. (Fig. VIII). Tailed Bristle Fern, V., N.S.W., Q. The specimen of *Trichomanes* mentioned in Part I, p. 223, Mallacoota, C. Barrett, proves to be *T. caudatum*; new for Victoria. It differs from *T. humile* in having pinnate fronds (a). One of the pinnæ is shown (b). The fruit-cups (c) are much like those of *T. venosum* in shape, with the similar long, but often thicker, receptacle (d). It was gathered well this side of the border, pendent from the trunk of a fern.

TRICHOMANES HUMILE. Another scrappy specimen—with no date or collector's name—has come to light. It is one from Gembrook, the locality of Mr. Lucas's specimen. Collectors visiting Gembrook should search carefully for this rare fern.

ALSOPHILA REBECCÆ, F.v.M. Part I, p. 226.

From particulars supplied by Mr. C. French, senior, who knew Mr. Sayer well, and who, with Baron von Mueller, went through all that collector's specimens, it seems certain that the record for Victoria is erroneous. This tree fern is very distinct, and no authentic record exists of its occurrence in Queensland, S. of Rockhampton, or in New South Wales. The mistake has evidently occurred through a labelling error.



IN DEFENCE OF YOUNG.

It is perhaps not unusual to see birds defending their young, but a contest between a Hawk and a pair of Magpies recently at an altitude of 5500 feet gave us some entertainment in the early morning close to Mount Painter, N.E. Victoria.

A pair of Magpies, *Gymnorhina leuconota*, and their young were foraging on a flat among the "grasshoppers," *Tinzedas* and *Monistrias*. A hawk of some species skimmed low and tried to cut off one of the young birds. Immediately came a warning note from one parent, and the young magpies closed in. Again the hawk swooped, but the old bird was waiting, and rose to meet its enemy with a sharp snap of the bill, pursuing the hawk into a neighbouring tree. The patience of the hawk was admirable, and the Magpie returned to its family by a pretty, graceful curve.

In due course the hawk came again at its quarry, only to find a defender waiting. Five times the hawk swooped unsuccessfully. What a quick eye the parent bird had, and how confident were the young ones, which ran about feeding, oblivious of the enemy. One of the parents remained on the ground all the time with the fledglings, while the other was ready to accept the challenge. To us, from a distance of 100 yards, the Magpie seemed to rise first, and anticipate the hawk leaving the tree-perch.

Both birds remained on the same tree for some time after an attack, evidently, like practised prize fighters, waiting for an opening. When the Magpie deemed it prudent, he returned to the home circle, till the hawk resumed its quest. Finally, the Magpie family flew to the wooded country near the hut, the parents on the outside and the young ones inside; but the foiled hawk remained for some time on the tree, having abandoned the hunt. Some time later the cries of the young Magpies among the tree-tops showed that food was being brought to them.—A.J.T. and A.G.H.

RUFIOUS-BREASTED WHISTLER AS A MIMIC.

Mimicry is practised by some birds to whom that power is not usually attributed. Often the imitation is not deceptive, or is so only for a moment. At other times the strain is perfect. I noticed an example of this at Lake Kerferd, near Beechworth, in November, 1924. While following a pair of Robins, *Petroica goodenovii*, through the scrub, I heard a Grey Thrush, *Colluricincla harmonica*, call clearly several times. The notes were unmistakable—"Oh-I-am-dear-Boyee"—yet with each repetition I became more doubtful. The strain was perfect, the pitch exact, yet an indefinable difference in the quality of the notes sent me in search of the singer. He was soon found, and proved to be no Thrush, but a Rufous-breasted Whistler, *Pachycephala rufiventris*. A moment later he broke into his usual clear call—"Euricla, euricla, rick-rick-rick"—and did not, that I heard, again repeat the Thrush notes.—J. GALBRAITH.

SOME BIRDS OF THE MOUNTAIN TOPS.

A friend, who is used to the plain country, once expressed surprise that Crows were to be found on the summit of Mt. Feathertop. During a short stay at an elevation of between 5000 feet and 6000 feet above sea level, in the early part of February, we were interested in noticing some of the birds that inhabit these high altitudes. No doubt some, or most, of them advance to the highlands as the climate becomes drier down country, and in the same way leave the highlands in the autumn, as the weather grows colder.

Although we did not see Emus, it is common knowledge that they frequent the Fainter High Plains at 5600 feet. We saw at 5500 feet as many as 200 birds in a flight of Crows, and could not understand why the carcase of a beast was left untouched for more than a week, close by. Hawks were common. In one place on the High Plains, at 5800 feet, four circled over us for a long time, while we endeavoured to find a reason; but eventually the birds were driven off reluctantly and watched us at a distance from their rocky perch. Eagles were seen soaring higher than the highest mountains, 6100 feet, but never two together. Plover twitted during the day at 5800 feet.

Many Quails were seen, singly, in quick, short flight, at 5600 feet. A brace of Ducks rose from the Kiewa River, in the Pretty Valley part of the High Plains, at 5500 feet. Pipits, *Anthus australis*, were frequently met with at 5900

feet. Flame-breasted Robins, *Petroica phænicea*, were at home resting on the roof of our hut, or on that of an adjacent shed, at 5500 feet. Crimson Parrots, *Platycercus elegans*, were present in groups, feeding noisily on the seeds of Snow-gums, at 5700 feet.

Clumsy Gray Bell-magpies, *Strepera versicolor*, made themselves heard, as usual, with their "Chock, Chock" calls through the timbered country, at 5600 feet. At 5600 feet a large, grey, heavy, silent and shy bird, that seemed ever on the watch for our approach, but never uttered sound, flitted quickly and noiselessly from tree to tree, hiding itself in the same coloured dead Snow-gums. Again at 5500 feet there was a brisk, merry little bird which warbled, but kept out of our way as we followed to observe. It frequented the tree branches of the smaller Snow-gums, and was as large as a sparrow.—A.J.T. and A.G.H.

AUSTRALIAN INSECT-GALLS.

Dr. Van Leeuwin, Director of the Botanic Garden, Buitenzorg, Java, who visited Australia to attend the Pan-Pacific Science Congress in 1923, was much interested in galls of native trees. While the Congress was sitting in Melbourne, Mr. C. French, junior, and Dr. Leeuwin visited Sandringham, Cheltenham and Diamond Creek, in search of insect-galls, and collected a number of undescribed species. In a recent publication, "Revista Internazionale de Cecidologia," vol. 21, 1924, most of these galls are illustrated and described. The publication is in the library of the Government Entomologist, Science Branch, Department of Agriculture, Flinders Street, Melbourne, where anyone interested in these most remarkable insects are at liberty to consult it. The galls were found principally on *Banksia*, *Persoonia*, *Casuarina*, *Eucalyptus*, *Acacia*, *Cassyltha* and *Leptospermum*. The paper forms a valuable contribution to the study of galls.

The Editor invites members to contribute nature notes suitable for the Field and Study Section of the *Naturalist*. Paragraphs recording personal observations are most desired. Each issue of our journal might contain four or five pages of notes.

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EXCURSIONS.

SATURDAY, APRIL 24.—Botany School. Object: Botany.

Leader: Prof. Ewart. Meet at Botany School at 2.30 p.m.

MONDAY, APRIL 26.—Mount Macedon. Object: Trees.

Leader: Mr. P. R. H. St. John. Meet at Flinders Street Station in time for 6.40 a.m. train. Lunch to be taken.

SATURDAY, MAY 8.—Black Rock. Object: General. Leader:

Mrs. Coleman. Meet at Flinders Street Station in time for 1.25 p.m. train.

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ERRATA :

- Page 2, line 6—For "*aurantica*" read "*aurantiaca*."
- Page 40, line 5—For "*(oxylobium) ellipticum*" read "*(Oxylobium) ellipticum*."
- Page 41, line 8 from bottom—For "*Novæ Zealandiæ*" read "*novæ-zelandiæ*."
- Page 46, line 1—For "*subulata*" read "*subulatus*."
- Page 53, line 11 from bottom—For "*Dulicina*" read "*D. ulicina*."
- Page 54, line 6—For "*Xerotes*" read "*Lomandra*," and at page 56, line 22.
- Page 55, line 12—For "*Astroloma*" read "*Acrotriche*."
- Page 55, line 20—For "*exertus*" read "*exsertus*."
- Page 56, line 3—For "*Bredemeyra*" read "*Bredemeyera*."
- Page 68, line 11 from bottom—For "*Thryptoccene Mitchelliana*" read "*Thryptomene calycina*."
- Page 77, line 4 from bottom—For "*Menzesii*" read "*Menziesii*."
- Page 90, lines 4 and 7—For "*fluviatilis*" read "*fluviatile*."
- Page 121, line 13—For "*vaccinacea*" read "*vacciniacea*."
- Page 123, line 5—For "*Platycerus*" read "*Platycercus*."
- Page 123, line 25—For "*macrorrhyncha*" read "*macrorrhyncha*."
- Page 130, line 17 from bottom—For "*ciliatus* Stapf." read "*calycina*, Lindl."
- Page 133, line 21—For "*latifolia*" read "*lotifolia*."
- Page 133, line 26—For "*Calyptorhyncus*" read "*Calyptorhynchus*."
- Page 137, line 28—For "*Spiculoca*" read "*Spiculæa*."
- Page 144, No. 13, on Plate, "*Burnettia cuneata* Lindl."
- Page 162, line 13—For "*rosmarinifolia*" read "*rosmarinifolia*."
- Page 162, line 15—For "*Chorozema*" read "*Chorizema*," and line 2 from bottom.
- Page 162, line 2 from bottom—For "*Mitchelliana*" read "*calycina*."
- Page 218, line 5 from bottom—For "*diversifolium*" read "*populneus*."
- Page 219, line 24—For "*lopantha*" read "*lophantha*."
- Page 230, line 17—For "*Chiloclottis*" read "*Chiloglottis*."
- Page 237, line 5 from bottom—For "*vilossa*" read "*villosa*."
- Page 238, line 21—For "*Anigosanthes*" read "*Anigosanthos*."
- Page 239, line 16—For "*Ricinocarpos*" read "*Ricinocarpus*."
- Page 254, line 5 from bottom—For "*Pallied*" read "*Pallid*."
- Page 263, line 10—For "*cricifolia*" read "*squarrosa*."
- Page 265, line 5 from bottom—For "*Crytostylis*" read "*Cyrtostylis*."
- Page 298, line 20—For "*sepia*" read "*sepium*."

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THE Field Naturalists' Club of Victoria.

FOUNDED MAY, 1880.

MEMBERS,

30th APRIL, 1927

(With Date of Election and particulars of Branch of Study).

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Nov. 1917 NOVAR, VISCOUNT, G.C.M.G., London.

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REFERENCES.

o Signifies Members who have held office.
p " Members who have contributed Papers at the meetings.
M. " Address—Melbourne; S.M., South Melbourne; E.M., East Melbourne.
Ent. " Entomology; Col., Coleoptera; Lep., Lepidoptera.
Orn. " Ornithology; Ool., Oology.
Geol. " Geology.
Bot. " Botany.
Conch. " Conchology.
* " Died during 1926-27.
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April 1906 o p Armitage, R. W., M.Sc., Dip. Ed., F.G.S., Foam-street, Elwood . . Biol., Geol.
June 1906 o p Audas, J. W., F.L.S., F.R.M.S., National Herbarium, Sth. Yarra
Nov. 1919 Allen, C., 374 Auburn-rd., Hawthorn

CHARLES J. GABRIEL

BEQUEST

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— OF —

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The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 10th MAY, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER	SECONDER
Miss Embling, 258 High Street, Malvern	Miss G. Nethercote	Mr. C. Barrett
AS COUNTRY MEMBER—		
Mr. J. D. Long, Union Bank, Stawell	Mr. C. Oke	Mr. G. Coghill
AS ASSOCIATE MEMBER—		
Mr. William Mitchell, jnr., Rivernook, Buffalo River	Mr. H. B. Williamson	Mr. C. Oke

3. Nominations for Membership.

4. General Business.

Election of Two Auditors.
Nomination of Office-bearers, 1926-27.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

By Mr. A. J. Tadgell—"Mount Fainter and Beyond."
Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

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No. 509

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, April 12, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about fifty members and friends were present.

REPORTS.

Reports on excursions were given as follows:—Zoological Gardens, Mr. F. Pitcher; Observatory, Mr. C. Oke; Botanic Gardens, Mr. F. P. Morris; Hopkins River, Mr. V. Miller.

Mr. Pitcher moved that a letter of thanks be sent to Mr. A. Wilkie, the Director, for his kindness and attention to the party which visited the Zoological Gardens. Seconded by Mr. C. Daley, and carried. Mr. Oke moved that a letter of thanks be sent to Mr. Merfield for his kindness in devoting an evening, and the attention he had paid to members visiting the Observatory. Seconded by Mr. Harvey, and carried.

ELECTION.

On a ballot being taken, Miss Joan Harper, "Noojee," Avalon Road, Armadale, and Mr. T. Greaves, c/o Mrs. Hallett, Park Road, Cheltenham, were elected as ordinary members, and Mr. C. J. Daniels, 602 Kiewa Street, Albury, N.S.W., as a country member of the Club.

PAPER.

"Sperm Whale Head as a Sanctuary," by A. D. Hardy. The author gave a general description of Sperm Whale Head, and urged the desirability of having it reserved as a National Park for Eastern Gippsland. He showed a number of lantern slides depicting various shrubs and trees, also the different types of country and vegetation met with on the "Head" and adjacent parts.

At conclusion of his paper, Mr. Hardy moved that—

"In the opinion of the Field Naturalists' Club of Victoria, such Crown lands of Sperm Whale Head Peninsula, in the Gippsland Lakes, as are situated north-east of S. E. Barton's Allotment 21, Parish of Boole Poole, should be reserved as a National Park, and proclaimed as a sanctuary for native animals."

The motion was seconded by Mr. Williamson and carried unanimously. Several members, including the President,

Messrs. H. B. Williamson, C. Daley, C. Barrett, and F. Pitcher spoke in support of the project, and it was decided to appoint a sub-committee to further it. The following were elected:—Messrs. A. D. Hardy, F. G. A. Barnard, C. Barrett, C. Daley, A. E. Keep, C. Oke, and H. B. Williamson.

EXHIBITS.

By Miss E. Cameron: Osage, *Maclura aurantica* (North America), from Buchan, Gippsland.

Mr. C. Daley, B.A., F.L.S.: *Acacia discolor*, the Sunshine Wattle, from Nowa Nowa; also scoriaceous stones from crater at Tower Hill, Victoria.

By Mr. E. Hanks: Nests of the following birds from Wandin, Victoria:—Yellow Robin, Dusky Wood Swallow, Grey Fantail, Brown Flycatcher, Yellow-faced Honeyeater, and Goldfinch.

By Mr. A. E. Rodda: Head and neck of Brown Snake, *Diemania textilis*, from You Yangs, November, 1925.

By Mr. J. Searle: Aquatic larvæ. a—larva of *Ceratopogon* sp. (one of the midges); b—beetle larva with long branchial processes.

By Mr. A. L. Scott: Microscope fitted with a Bertrand's quartered quartz plate for measuring extinction angles of minerals in thin section.

NOTE.—The use of this device is to attain a greater accuracy than can be obtained ordinarily in determining the position of crossed nicols, and also in measuring extinction angles of minerals in thin sections. If this ocular be placed between analyser and polariser, and one of these latter slowly rotated, the quadrants in the eyepiece will change colour. At certain positions the colours can be matched, and the position of exact matching is the position of crossed or parallel nicols as the case may be. In measuring an extinction angle, the mineral is placed so as to appear lying across one parallel to the other of the dividing lines of the quadrants which have been previously calibrated to the nicol axes. The position of the stage is noted, and the stage rotated until the colours of the sections of the mineral in the two quadrants match. The stage position is again read, and the difference of the reading gives an extinction angle.

By Mr. T. G. Sloane: Specimens showing the state of the foliage of nine-tenths of the red gum trees, *E. rostrata*, along the banks of the Murray River at Mulwala in March, 1926. Collected 4/4/26 by T. G. Sloane. Also *Callistemon paludosus* (Swamp Bottle-brush) on which *Loranthus pendulus*, the Drooping Mistletoe, was growing.

EXCURSION TO WARRNAMBOOL.

Eight members of the Club mustered for the excursion to the Hopkins River. On the railway journey to Warrnambool on April 2 the extremely dry nature of the season was evident in the absence of verdure, the Western District having as yet received very little rain. In several parts of the Otway Forest volumes of smoke showed that bush fires were still a menace. The grass is not yet springing on the rich volcanic soil, which everywhere shows striking evidence of bygone volcanic activity in which Mounts Moriac, Elephant, Noorat, Rouse, Leura, and other vents took such a prominent part.

On arrival at Warrnambool the party proceeded to Mrs. Proudfoot's, at the boat-sheds, a resort favourably situated about two miles out on the Hopkins River, and well known to anglers throughout the State.

The Hopkins is an example of a drowned river valley, and for about six miles up-stream is a fine river, sometimes hundreds of yards in width. Like most coastal streams, its mouth is barred with sand. The river is frequented by fish, especially bream and mullet. Excursions were made by boat to the mouth of the river, where, in the cliffs, some old kitchen middens were examined, and on the other side of the entrance along the beach specimens of seaweed were gathered at the request of Mr. Lucas, of Sydney.

Two pleasant trips were made by motor-boat up the river, on each side of which, for about five miles, rise steep, broken, honey-combed cliffs, very scantily vegetated near the stream, the hills on each side being bare and treeless except for an occasional *Casuarina*. The composition of these hills is the prevailing, widespread, dune sandstone, bedded and consolidated with a "top-dressing" of volcanic soil varying in depth. Draping the cliffs here and there are graceful mats of *Mesembryanthemum*, whilst a few *Casuarinas*, *Boobyalas*, stunted *Acacias* and the Kangaroo Apple maintain a precarious footing.

The comparatively treeless nature of the soil covering the dune sandstone or limestone is a characteristic of these Western District plains. There is, strange to say, a striking absence even of *Eucalypts*, only a few stunted specimens being seen. Sheoaks grow well about five miles up the river. The trees which, from their spreading roots seem best adapted for growth, are various species of pine, especially the *Araucaria* or Norfolk Island pine, which flourishes well in and around Warrnambool;

Jubilee Park, about six miles up the river, is well planted with pines, which, with the native *Casuarinas*, give shade and shelter on the Camping-ground. Above this the river becomes shallower, and, beyond tidal influence, an intrusion of basalt in the stream, makes progress up-stream more difficult for boats. Water-birds were numerous on the wide stretches of the river. About two hundred or more swans frequented the shallows about a quarter of a mile in front of the boatsheds, while seagulls, cormorants, black duck, teal, coots, and other birds were seen from time to time, and white-fronted herons, as lone fishermen, were frequently observed along the banks. About 30 species of birds were listed.

A visit was paid to the local Museum, which has a good, if somewhat incongruous, collection of specimens. There is a fine and characteristic collection of stone axes and implements, showing how, in the absence of better material, basalt was extensively used by the south-western tribes of Victoria, especially for the grooved axe-heads. An interesting slab of sandstone from one of the quarries, showing the two impressions like footmarks and other supposed evidence of man's presence, is on view. This exhibit, when discovered, was the subject of much discussion as to its genuine nature, and as evidence of the antiquity of man in Australia.

The chief excursion was that on Easter Monday, to Tower Hill, on approaching which may be seen the rich land resulting from its outpourings when in action ages ago. In the road cuttings are stratified layers of volcanic ash, forming the rock surface just beneath the over-burden of soil. We ascended the highest part of the extensive volcanic basin—a conical hill 323 feet in height. This remarkable crater is about two miles in diameter, and at one time contained an expanse of water, now much reduced. A fine view is obtained from the Hill, which appears to have been the central focus of eruption, among many other vents within the whole area. A hard, volcanic plug from which erosion has taken place evidently gives the Hill its conical shape. Right on the summit, within the space of a few yards, quite a collection of insects was made—moths, beetles, flies, slaters, etc., also spiders, being found.

A few hundred yards away was a crater of perfect shape, probably more than 100 feet deep, its steep sides being loose, scoriaceous material, lava and ash. Some of the party descended to the bottom, which was caked with black mud, on which grew various plants, including the thistle, the common bulrush, various grasses, the stinging nettle, etc. On one side was a clump of *Boobyala*, and half way up the cindery slope was a solitary *Casuarina*. The extensive crater, so

fruitful in producing the wonderfully rich soil of the surrounding district, was probably the most recent of the volcanoes which poured their lava flow over so wide an area in western Victoria.

Opportunity was taken to visit the rough, disintegrating cliffs at Thunder Point and Shelly Beach, and also the Breakwater, the protective mass of masonry at the entrance to Warrnambool Bay, in which, some years ago, a subsidence, with fractures in the huge wall, occurred. A visit was also made to the Cemetery, where, in the twisted, fractured, or inclined positions of some of the monuments and tombstones, may be seen the result of an earth tremor or movement recorded a couple of years ago, and evidently focusing in the area on which the Cemetery is placed.

A return to Melbourne was made on Tuesday, after an enjoyable outing.—C. DALEY, V. MILLER.

MARINE ZOOLOGY.

Despite the forecast of stormy weather, a party of naturalists assembled on Port Melbourne Town Pier on Saturday morning, April 24, for a dredging excursion. The sky was grey-clouded and a slight mist was over the Bay. The wind, boisterous during the night, had dropped to a light breeze that carried our craft at about five or six knots an hour across the Bay towards Altona. After rounding the black buoy that marks the end of the reef, and heading for Point Cook, we cast the dredge for a trial haul. The bottom proved rough in patches, and our first couple of casts did little more than "hop-scotch" over the stony bed and gather up a few molluses and a fine collection of stones, from egg size to one weighing several pounds, and almost filling the mouth of the dredge.

We soon got away from this formation, and then the dredge brought up a plentiful supply of weed filled with all kinds of marine life. Crested Weed-fish, *Cresticeps*, of brilliant hues and marvellous shapes; Leatherjackets, an inch or two in length, with a formidable-looking dorsal spine, the remnant of the dorsal fin, from which it takes its generic name, *Monocanthus*; Parrot-fish, with varied coloured stripes; "Cobblers," the local name for the Fortesque, so dreaded by fishermen for the possession of spines at the side of the head, which can be erected at will, and inflict a most painful wound; and a single specimen of the curious little Sea-dragon, *Pegasus draconis*, were among the numerous fishes brought up by the dredge.

Long, narrow, green Isopods, resembling the *Zostera* among which they live, nimble amphipods, Mysis-like shrimps,

curious little snapping shrimps, and larger prawns were found among the smaller crustacea. There were crabs of all shapes and sizes; quaint creatures with long swimming legs, flattened at the ends, like oars, attached to a triangular carapace about half an inch across and scarcely more than one-sixteenth in thickness; short-legged, nut-shaped crabs, almost covered with a sponge, or a colony of ascidians; larger Spider-crabs, with a complete covering of algæ of many kinds on their carapaces and limbs, that formed a cunning disguise, either for protection from foes or to enable the crabs to stalk their prey.

At intervals between the weed-beds would be banks of dead shells and sand, from which the dredge invariably brought up numbers of the small Heart urchin, an echinus resembling the fossil casts of *Lovinia*, so common at Beaumaris. In other weed-beds were found the little Sea Horse, *Hippocampus*, and its near relative, the Pipe Fish, *Syngnathus*. Growing on many of the seaweeds were numerous colonies of Hydroids, such as *Plumularia obliqua*, *Campanularia*, and others; and Polyzoa, *Crisia tensus*, etc. Worms were frequently brought up—Terebellidæ, Nemertine, Neries. Polychæts and *Polynæ*, with its curious coat of mail. Starfish were many and various; beautiful Feather stars were numerous. These crinoids can swim fairly rapidly, and are then objects of grace and beauty, the five biramous arms alternately beating in unison; flat, hard, biscuit-like stars; the common dark-coloured, leathery stars; large 8-10 rayed stars, ten or twelve inches in diameter, were numerous. Brittle stars were less plentiful. Echini, other than the Heart urchin, were seldom brought up; the largest noted was a red-coloured one, about $2\frac{1}{2}$ inches across, with numerous very thin spines.

Later in the afternoon the wind freshened and there were strong indications that the forecast might eventually be fulfilled, so our bows were turned homewards, and Port Melbourne was reached at 6 p.m. (just as the rain commenced). Here the party separated, each laden with bottles containing ample material for study at home. It is a pity dredging excursions are not more frequently arranged. The work is intensely interesting, if at times arduous, and the amount of material collected is marvellous. A great deal of work remains to be done, and it is work that our Club should undertake. If the Bay was marked out in sections, and each thoroughly worked over, and the collections handed to specialists for identification and description, we would soon have a good knowledge of what our Bay contains, while our Museum would be enriched by a good collection of local specimens.—J. SEARLE.

VICTORIAN CHITONS

BY EDWIN ASHBY, F.L.S., M.B.O.U., ETC.

The study of Chitons should appeal to Australians, and especially to those who reside in Victoria, for the following reasons:—

(1) As Dr. S. S. Berry, the well-known American conchologist, stated in a letter to me some years ago, "The metropolis of the Chiton world is to be found either in Australia or the western coasts of North and South America." It seems almost certain that Australia holds the first place; but this can only be determined when a great deal more effective work has been done around our coasts.

(2) Although the records from Victoria do not equal those from South Australia, and barely those of New South Wales, it should have representatives of the fauna of each of those States within its boundaries. New South Wales has a fauna peculiar to a warm equatorial current, which impinges on the Australian coast a little north of Brisbane, and flows southwards down the coast of New South Wales; and probably the influence of this ocean current extends to a point a little below Mallacoota, from which locality Mr. Charles Barrett has recently brought specimens of *Ischnochiton* (*Haploplax*) *lentiginosus*, Sow., a familiar N.S.W. species, which is decorated all over with blue spots.

Then, the western part of Victoria is washed by the great, cold current that flows from the west along the southern coast of Australia, the main stream turning a little southward down the western coast of Tasmania. The late Mr. Dillon, of Portland, has added several species to the known fauna of Victoria that were heretofore considered peculiar to the adjoining State of South Australia.

ECOLOGY.

Some knowledge of the conditions favourable to Chiton life will be necessary before one can become a successful collector or student. Most species are littorine, living in comparatively shallow water, and can, therefore, be reached at low tide. They adhere to rocks, which, by preference, must be smooth on some parts of their surface; limestone or sandstone, unless the grain is very fine, is not favourable; those rocks which have some flat surfaces, are piled one on the other and are not too large to turn over, will prove to be the best hunting ground. Slate (mudstone) rocks for this

reason have the highest record, and next to them come some of the igneous rocks and hard, close-grained sandstone.

One group, the *Stenochitons*, lives on sea-grasses, those marine plants that are so often called seaweed (algæ), although they produce flowers and fruits. This group of plants covers miles of the shallow waters around the Australian coasts and inlets. All the five known species of *Stenochiton* are found in South Australia, but of these only two have, up to the present, been recorded from Victoria. It is almost certain that at least two others will ultimately be found in that State. Only one of the five is a deep-water form, *S. pallens*, Ashby; the single example from Victorian waters was dredged by Bracebridge Wilson, near Port Phillip Heads, many years ago. *S. longicymba*, Blainville, retires during the daytime into the brown sheaths at the base of the stems of Ribbon-weed, *Posidonia australis*, and the almost-transparent form, *S. posidonialis*, Ashby, just above the brown, half-buried sheaths; the little hump-backed species, *S. cymodocialis*, Ashby, is found on the cylindrical stems of the other common sea-grass, *Cymodocea antarctica*.

ROCK FORMS.

The best-known chiton is the great *Plaxiphora albida*, Brach. This is found in Port Phillip on large exposed rocks, but will also be seen on rocks facing the open sea; with their strong armour and well-protected girdles, these chitons are able to dare the surf of the breakers. The girdle is covered with bristles, and the whole animal, more often than not, with seaweed. The sculpture varies from perfectly smooth specimens to shells covered with coarse wrinkling, with one or two diagonal ribs. For years I have been collecting specimens of *Plaxiphora* from all round the Australian coasts, and I believe that every stage of intermediate form still exists, from one extreme to the other, and I am, therefore, inclined to consider them as varieties of one species, *P. albida*, Brach.

The extremely sculptured form, *conspersa*, Angas, the two smooth forms, *tasmanica* and *bednalli*, both of Thiele, all are varieties of *albida*. But, until an exhaustive examination has been made of the complete series, collectors must please themselves as to whether they recognise these as good species, or as mere variants of one very variable species. It will help much towards reaching a true solution of the problem if collectors will endeavour to obtain a good series from as many localities as possible.

Perhaps the handsomest species of Australian chitons, excepting those whose beauty is revealed by a pocket-lens,

belong to the sub-genus *Rhyssoplax*, which forms a section of the genus *Chiton*, s.s. Of the members of this genus the one most often met with in Victorian waters is *R. jugosus*, Gld., a very deeply-keeled shell, reaching over $1\frac{1}{2}$ inches in length, and handsomely sculptured with coloured longitudinal ribs. In the western part of the State another charming form, *R. tricastalis*, Pils., is found, in which the longitudinal ribbing is less conspicuous, but it has three to four very coarse, nodulose lateral ribs; the shell varies in colour into many shades of brown, red, and yellow. Both these species prefer rocks in deep, clean pools; rocks upon the upper side of which brown seaweed grows—the chitons will be found on the sides of the rocks.

Most chitons will not face rough water, for the rolling over of the stones by the sea waves crushes them; therefore it is only those forms that have exceptionally strongly-built shells, and strong girdle attachment, that can face these odds. Those that are not so strongly furnished perforce have to choose sheltered waters, or take refuge under the lower rocks of a pile, or on the under-sides of rocks embedded in a sandy bottom.

In Port Phillip, at Mornington, and elsewhere, a little tufted-chiton, *Acanthochiton retrojectus*, Pilsbry, is common on the stones that are almost covered at half tide. At the same tide level, on the under-sides of stones resting on a sandy bottom, will be found in numbers two species of thin-shelled chitons, *Ischnochiton lincolatus*, Bl., and the smoother form of *I. atkinsoni*, called *lincolnensis*. Representatives of both these species vary in colour from black to white, and through a variety of shades of reds, greens, etc., their colour pattern is quite as variable. *Lincolatus* has the scales of the girdle much larger than those of the other species.

In water a little deeper, that is, in shallow pools at lowest spring-tide, under the bottom rock, a large black chiton, *Ischnoradsia evanida*, Sowerby, occurs. The largest I have is $3\frac{1}{2}$ inches in length. They are very numerous at San Remo, but wherever smooth, sheltered rocks exist round the Victorian coast the species should be met with.

The little *Kopionella matthewsi*, Ire., looking outwardly like a small *Plaxiphora*, has recently been found at Mornington by a girl just 11 years of age. This chiton, when examined under a pocket-lens, is found to possess, in addition to two rather ordinary forms of girdle bristles, a third kind of glassy, slender bristle, surmounted by a white swollen head, shaped much like a paddle blade. This peculiar feature was discovered by the writer some years ago, and suggested the name of the genus, *Kopionella*=a little oar.

The tail valve of this species is turned up much as in the genus *Lorica*. The *Kopionella* is to be searched for in pools at low tide, and will more often be found on the sides of the rocks than underneath them.

Two specimens of *Kopionella* were collected this January at Mornington by Dorothy Green, a member of the Mornington Naturalists' Club, which is doing good work under the guidance of the Rev. George Cox. With the exception of a specimen in the collection of Mr. C. Gabriel, which came from Portland, this is the first record for the State.

In similar situations will be found, in Victorian waters, a highly-sculptured chiton called *Callistochiton meridionalis*, Ashby. The pleural area is a beautifully executed network, and the lateral areas are furnished with two large nodulose ribs. The two handsome chitons, *Calliozona* and *exoptanda*, the former green, the latter pink, both have to be searched for in deep pools below lowest tide mark, and on rocks partly bedded in coarse, clean sand. The green and ivory species, *bednalli*, was dredged by Bracebridge Wilson, near Port Phillip Heads, and seems to frequent pools too deep for the wader to reach.

It will be gathered that, from half-tide down to 3 feet below lowest low-water mark each foot or two of level will have its particular species of chitons, and Professor Harvey Johnston used the Queensland chitons to distinguish the various zones at which other forms of marine life are to be found. While some forms of *Acanthochitons* (chitons with tufts of bristles at the sutures) are to be found in large numbers in sheltered shallow water, there is another group of the same genus that occurs only below lowest tide-mark, and then rarely. The three Victorian species, *A. wilsoni*, Sykes, *A. pilsbryi*, Sykes, and *A. gatliffi*, Ashby, all belong to this group, and are only found in the situation mentioned above, or dredged.

At least many forms as yet unrecorded from Victoria will be found, with the addition of some that are quite new to science, if a new race of earnest workers can be stimulated into action. These intending students must be prepared to don old clothes and work up to the middle at lowest tides. An iron bar, or hook, will greatly help in the turning over of the larger rocks. It means work, but, at least during the summer months, the experience is a delightful one and within the reach of all.

STRUCTURE AND OTHER CHARACTERS.

Before dealing with the evolution of chitons, some brief explanation seems needed as to the life history and the characters of the animals and their shells. In common with the *Gastropoda*, they are stomach-footed, have a separate head, which is furnished with a tongue (radula) armed with numbers of hook-like teeth, by means of which the animal rasps off food. The body is furnished with gills, placed along the sides in varying positions according to the genus.

The juvenile chiton is free-swimming, but very early commences to form its coat-of-mail shell, composed of eight separate parts (valves), which are beautifully hinged together and tied, on their outer margin, to the leathery girdle. The girdle, in most forms, is capable of great expansion and is variously protected and ornamented with glass-like scales of great beauty, glassy bristles in varied forms and chalky spines blunt or otherwise.

The ornamentation of the shell has been aptly termed "sculpture." While the designs are extremely varied and often intricate in detail, they always conform, in some measure, to a common plan, made up of three areas: a V-shape dorsal area, a V-shape pleural area, and an inverted V-shape lateral area.

The character of the sculptural ornamentation of the shell, and that of the girdle clothing, except when supported by other less superficial differences, are considered by authorities as specific characters only. The most important generic distinctions are to be found in the changes in the "insertion plate," which is an outward growth of the inner layer of shell, forming a sort of "fang," to which the girdle is attached—in the position and numbers of the gills, and in the dentition of the radula. These are supplemented, in a few genera, with alterations in the shell and girdle, which correspond with special structural features in the animal.

The colour schemes have practically no specific value, varying, as they do, in a single species from white to black, through pink, red, yellow, orange, green, and blue, with a wide variation in pattern, mostly made up of geometric designs bilaterally uniform.

EVOLUTION OF CHITONS.

Chitons are found in the Palæozoic rocks of the Northern Hemisphere, and occur in these primary rocks in quite an advanced stage of development, as regards sculpture and form; but in all the known primitive genera, the insertion plate is absent, whereas in all living forms, with the exception of the *Lepidopleuridæ*, the insertion plate is present.

The absence of this feature means that the girdle is easily detached by the rolling over of the rocks, to which the creature is adhering, by the waves, and serious, if not fatal, injury done to the animal.

The more strongly the girdle is attached to the shell, by so much is the degree of risk to the animal lessened; thus, in the development of the insertion plate, we have a most important survival factor, and in the ingenious devices adopted to this end, we can read, as in a book, the history of the evolution of chitons throughout the ages of the past. I am aware that Iredale and Hull, in a recent publication, have suggested that the absence of the insertion plate in living members of the Family *Lepidopleuridae*, is due to degeneration, but, as this hypothesis is unsupported, as regards the genus *Lepidopleurus*, by any important factor, it seems to confuse classification.

Two, if not three, species of *Lepidopleurus* live in the shallow waters of Victoria; a little cream-coloured shell about half-an-inch in length; a smaller one, with blood-red body and very fragile, highly ornamented shell; and a still smaller species, with coarser sculpture than the last. These are called, respectively, *livatus*, *matthewsonianus*, and *badius*. They live underneath the bottom rocks and stones, where one or more are piled on top of each other; it is undoubtedly this habit of secreting themselves in such protected situations that has enabled members of the *Lepidopleuridae* to survive down the ages, in spite of their imperfect girdle attachment.

In Australian waters several other members of this genus exist, but all are deep-water species, only obtained by dredging, their survival being accounted for from the fact that the depths at which they live are undisturbed by the storms which are a serious menace to littorine forms.

Then, as we follow up the scale of development, starting with the genus *Lepidopleurus*, whose members have no insertion plate, we have, in the Northern Hemisphere, *Hantleya*, with the insertion plate in the anterior valve only; an Antarctic genus, *Hemiarthrum*, with insertion plate in the two end valves only; then forms with insertion plates in all valves, but no slits. None belonging to this stage of development, however, have yet been found in Australian waters. The genus *Chorioplax*, which is represented by two species, *grayi*, Ad. and Ang., from Sydney (one example only), and *C. pattisoni*, Ashby, from South Australia (one example). This genus has no slits in its insertion plate, and was thought by earlier writers to belong to the *Lepidopleuridae*; but I have shown, in an earlier paper, that its true place is much higher up in the genetic-tree — that it

really has highly developed insertion plate in which the slits have been suppressed, owing probably to the peculiar environment in which it lives.

The next stage is one in which there are insertion plates in all valves, and these plates are deeply slit, thus enabling the muscles to tie the shell to the girdle more strongly. The *Ischnochitons*, of which a number of species can easily be obtained round the Victorian coast, well illustrate this stage of chiton evolution.

Then we have in the true *Chitons*, which in Australia are known under the sub-generic name *Rhyssoplax*, in addition to the slits in the insertion which divide it into what are technically known as "teeth" (although serving a very different purpose), a fine serration of the edges of the teeth is present, which still further increases the strength of the attachment of the girdle. In another genus, represented in Victoria by *Callistochiton meridionalis*, Ashby, the sides of the slits are "festooned"—curved outwards; in *Callochiton* represented in Victoria by three species, the "teeth" are fluted.

All these changes, we believe, have been brought about to strengthen the attachment of the girdle. Chitons possessing these improvements are able to venture out of the protection of sheltered holes, and the undersides of more or less buried rocks, into much more exposed positions, and some forms even into the rough and tumble of the ocean surf on the rocks exposed to the full force of the waves.

It is by means of these "survival factors" that the "expectation of life" of chitons has been increased, and they have been enabled to venture into feeding grounds which are still closed pastures to the more primitive forms.

LOCALITY LIST OF VICTORIAN CHITONS.

Class AMPHINEURA.

Order Polyplacophora.

Family LEPIDOPLEURIDÆ, Pilsbry.

Genus *Lepidopleurus*, Risso.

Lepidopleurus liratus, Ad. and Ang. Port Phillip Heads, Ocean Beach, Phillip Island (G. and G.).

badius, Hed. and Hull. Torquay and Portland (G. and G.).

profundus (Ashby M.S.), May. Dredged Port Phillip Heads (J.B.W.).

columnarius, Hed and May. Dredged Endeavour, Bass Strait.

*Family **PROTOCHITONIDÆ**, Ashby. (Fossil only)Sub-order **Chitonina**, Thiele.Family **ACANTHOCHITONIDÆ**, Hedley.Sub-family **AFOSSOCHITONINÆ**, Ashby (Fossil only)Sub-family **ACANTHOCHITONINÆ**, Ashby.Genus **Acanthochiton**, Gray, em.

Acanthochiton sucuri, Blainville, syn. *asbestoides*. Smith. Wilson's Prom., Kershaw.

granostriatus, Pilsbry. Black Rock, Sandringham, Port Phillip, Portsea, Torquay, Portland.

bednalli, Pilsbry. Port Phillip Heads (J.B.W.)

pilsbryi, Sykes. Western Port, Shoreham (G. and G.). Port Phillip Heads (J.B.W.).

kimberi, Torr., Torquay, Portsea and Portland (G. and G.).

retrojectus, Pilsbry. Coasts generally.

variabilis, Ad. and Ang. Mornington, Torquay, Portland, and Shoreham (G. and G.).

gatliffi, Ashby. Port Phillip Heads (J.B.W.). Point Cook, Port Phillip (G. and G.), dredged.

Genus **Notoplax**, H. Adams.

Notoplax wilsoni, Sykes. Port Phillip Heads (J.B.W.).

glyptus, Sykes. Port Phillip Heads (J.B.W.). Portsea; Western Port; off cable, Bass Strait (G. and G.).

matthewsi, Bed. and Pils. Port Phillip Heads (J.B.W.).

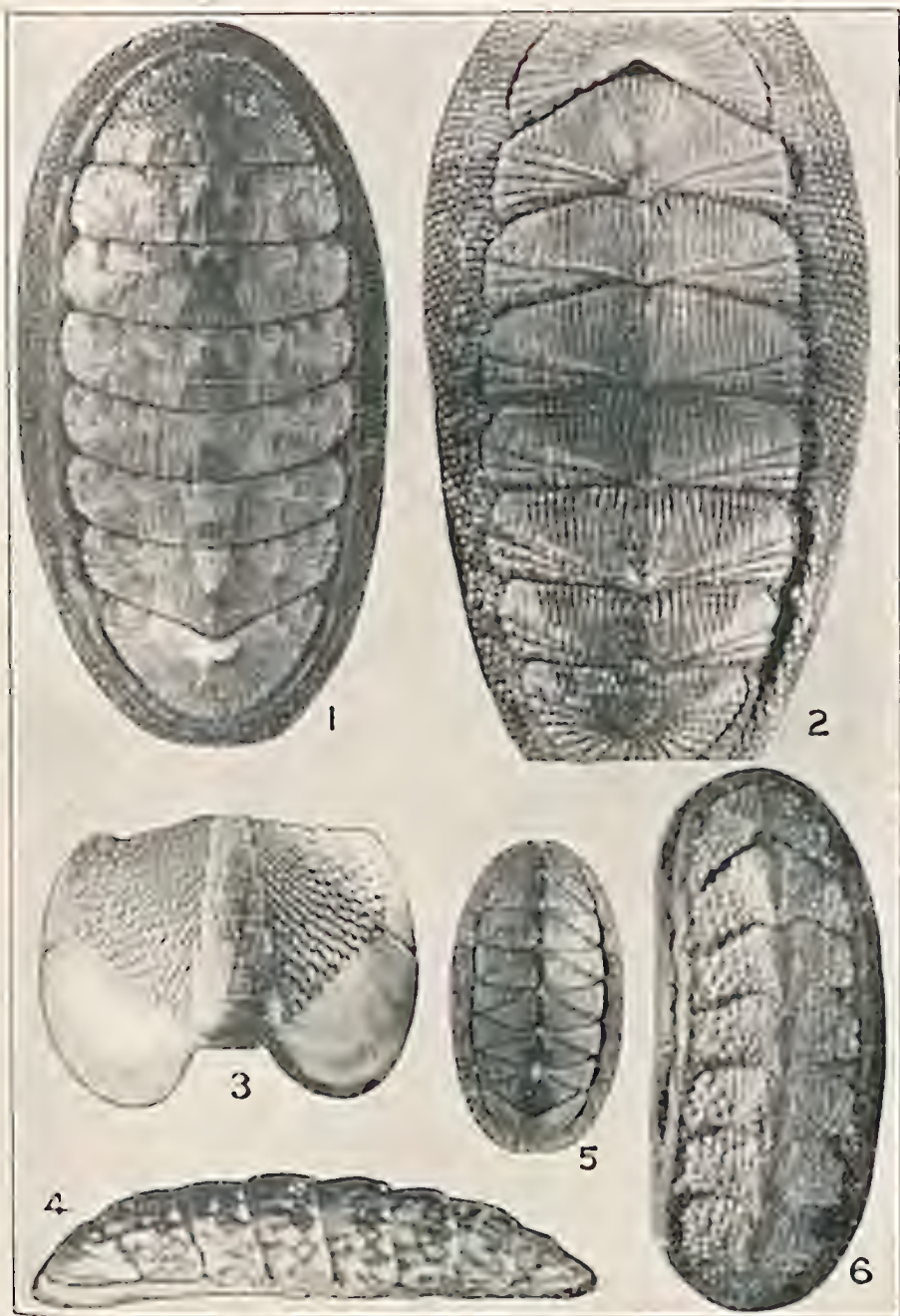
speciosus, H. Ad. Westernport; Portland; off Piles, Portsea Pier (G. and G.). Port Phillip Heads (J.B.W.).

Sub-family **CRYPTOPLACINÆ**, Thiele.Genus **Cryptoplax**, Blainville.

Cryptoplax striatus, Lamarck. Port Phillip, Western Port (G. and G.).

*Pilsbry places the *Ischnochitonidæ* and the *Mopaliidæ* earlier than the *Acanthochitonidæ* in the order named, but Thiele considered that Family more primitive than the *Ischnochitonidæ*. Owing to the additional light thrown upon this group by the examination of examples of the fossil genus *Protochiton*, I placed the Family *Protochitonidæ* immediately above the *Lepidopleuridæ*, considering that these forms were the progenitors of the *Acanthochitonidæ*, expressing it as my opinion that this latter family was never derived from the *Lepidopleuridæ*, but from an even more primitive stock along parallel lines, and await the confirmation of this surmise by the discovery of intermediate fossil forms.

PLATE I

*pallidus* *Wood*

PHOTOS, E. ASHBY

Fig. 1—*Ischnochiton pallens* (enlarged). Fig. 2—*Chiton (Rhyssoplax) vauchusensis*. Fig. 3—Median valve of holotype of *Notoplax stewartiana* (enlarged). Fig. 4—*Stenochiton cymodocialis*. Fig. 5—*Chiton (Rhyssoplax) jugosus*, var. *diaphora*. Fig. 6—Holotype of *Notoplax (Amblyplax) rubiginosus*.

iredalei, Ashby (previously recorded under name of *gunni*, Rv., which is a Tasmanian var. of *striatus*), Flinders, Western Port, Torquay (G. and G.).

Family **CALLOCHITONIDÆ**, Thiele.

Sub-family **CALLOCHITONINÆ**, Thiele.

Genus **Callochiton**, Gray.

Callochiton platessa, Gould, Portland (G. and G.).

rufus, Ashby, Port Phillip Heads (J.B.W.).

mayi, Torr. Portland (G. and G.).

†Family **MOPALIIDÆ**, Pilsbry.

Genus **Plaxiphora**, Gray.

Plaxiphora albida, Blainville, syn. *costata*, Blv., smooth var., var. *tasmanica*, Thiele, syn. *bednalli*. All coasts.

Genus **Kopionella**, Ashby.

Kopionella matthewsi, Ire, Portland (Gabriel Coll.), Mornington (D. Green).

Family **ISCHNOCHITONIDÆ**, Pilsbry.

Genus **Ischnochiton**, Gray.

Ischnochiton torri, Ire and May, Port Phillip Heads (J.B.W.).

lineolatus, Blainville = *crispus* auct. All coasts.

atkinsoni, Ire. and May, ^{Syn.} var. *lincolnensis*, Ashby. All coasts.

falcatus, Hull, Port Phillip Heads (J.B.W.). Western Port, Ocean Beach, Phillip Island (G. and G.).

wilsoni, Sykes, syn. *luevis*, Torr. Port Phillip Heads (J.B.W.).

Verrucosus ^{Syn.} *proteus*, Rv. Coasts, generally.

proteus, var. *milligani*, Ocean Beach, Point Nepean, Shoreham, San Remo (G. and G.).

~~*contractus*~~, Rv., syn. *decussatus*, Rv. Portland (G. and G.).

pallidus *pallens*, Rv., non *contractus*, Rv., syn. *iredalei*, Dupuis. Portland (G. and G.).

virgatus, Reeve. Coasts generally.

gabrielii, Hull, Western Port.

Sub-genus **Stenochiton**, Ad. and Ang.

Stenochiton cymodocialis, Ashby, Portland and Lorne (G. and G.).

pallens, Ashby, Port Phillip Heads (J.B.W.).

Sub-genus **Haploplax**, Pilsbry.

Haploplax pura, Sykes, Port Phillip Heads (J.B.W., G. and G.).

†I have followed Thiele in placing the *Mopaliidæ* before the *Ischnochitonidæ*.

smaragdinus, Angas. Sub-species *resplendens*, Bed. and Mat. Port Fairy, San Remo, Torquay, Portland (G. and G.).

lentiginosus, Sowerby, Mallacoota, C. Barrett. First record.

thomasi, Bednall. Torquay, Portland (G. and G.).

Sub-genus *Heterozona*, Carpenter.

Heterozona cariosus (Carp.M.S.), Pilsbry. Port Phillip Heads (J.B.W.). Flinders, Western Port, Port Fairy, Portland (G. and G.).

subviridis, Ire. and May. All coasts.
~~*Ischnochiton pusillus*~~ *pusillus* ~~*var. pusillus*~~ *all coasts.*
Genus *Callistochiton*, Carpenter.

Callistochiton meridionalis, Ashby. Portland.

" *maurice* *J. & May*.

Family CHITONIDÆ, Pilsbry.

Sub-family CHITONINÆ, Pilsbry.

Genus *Chiton*, Lin.

Sub-genus *Rhyssoplax*, Thiele.

Rhyssoplax jugosus, Gould, var. *diaphora*, Ire. and May. Torquay, Port Fairy, Portland (G. and G.).

calliozona, Pilsbry. Back Beach Phillip Island, Portland (G. and G.).

croptanda, Bednall, dgd. near Newhaven, Phillip Island, off cable Bass Strait (G. and G.).

bednalli, Pilsbry. Port Phillip Heads (J.B.W.). Off cable, Bass Strait (G. and G.).

tricostalis, Pilsbry. Port Phillip Heads (J.B.W.). Port Fairy, Portland (G. and G.).

Sub-family LIOLOPHURINÆ, Pilsbry.

Genus *Lorica*, H. and A. Adams.

Lorica cimolca, Reeve. Back Beach, Williamstown (P. and G.).

Genus *Loricella*, Pilsbry.

Loricella torri, Ashby. Dredged off Rhyll, 5 fms. Western Port (G. and G.).

MEMO.—My warm acknowledgments are due to Messrs. Gatliff and Gabriel for checking the above list and supplying additional localities. J.B.W. refers to Rev. J. Bracebridge Wilson collection. G. and G. mean that the localities attached are those given in papers by Messrs. Gatliff and Gabriel, or that one or other of them has specimens from that locality in their collection. P. and G.=Pritchard and Gatliff. *Ischnochiton ptychius*, Pils., has not been included because the single record was probably a misidentification of *I. falcatus*, and also I have shown, in an earlier paper, that Sykes record of *I. tateanus*, Bed., was due to a similar misidentification.

SOME ADDITIONAL MICROZOA FROM THE
RED LIMESTONE AT GRANGE BURN, VIC.

BY WALTER J. PARR

(Read before the *Field Naturalists' Club of Victoria*,
March 5, 1926)

In volume XXXII of the *Victorian Naturalist*¹ Mr. F. Chapman gave a list of the smaller fossils he had obtained from a sample of weathered limestone, collected opposite Mr. Henty's homestead, on the Grange Burn, near Hamilton. The evidence thus provided gave support to his view already expressed in Memoir No. 5 of the National Museum,² Melbourne, that this limestone occupied an intermediate position between the Balcombian and the Kalimnan, and was on the Batesfordian horizon of the Janjukian.

Recently, by the kindness of Mr. Chapman, I was enabled to examine other material he had collected at the same time from the Grange Burn limestone. As the foraminifera and ostracoda found, link the microscopic fauna of the upper portion of the Lower Beds at Clifton Bank with that already described from the Grange Burn limestone, it has seemed desirable that a list of them should be recorded. Advantage has also been taken of the opportunity of comparing the foraminifera of both deposits with those of the Janjukian limestone of Batesford.

In appearance, my sample was similar to that dealt with by Mr. Chapman. It was a decomposed polyzoal limestone of a warm-brown colour, but was much richer in foraminifera and ostracoda, the former including a number of species of *Miliolidae*, a family which was not represented in Mr. Chapman's list. Probably the sample came from a less calcareous stratum of the limestone, as the *Miliolidae* were not of the type usually found in our polyzoal limestones.

Including those recorded by Mr. Chapman, which are prefixed thus (*), the subjoined list records the occurrence of 58 species and varieties of foraminifera, and four of ostracoda. Nearly all of these are known from the Batesford limestone, but, with the exception of *Calcarina defranci*, *Gypsina howchini*, *Amphistegina lessonii*, the *Lepidocyclina*, and *Cytheropteron batesfordiense*, are not specially characteristic of this Janjukian horizon.

¹ Pp. 144-146. Figure in text.

² 1914, p. 47.

Species which are elsewhere unknown from the older series—the Balcombian—but in this area occur in the Grange Burn limestone, as well as in the brown marl at Clifton Bank, are:—*Pentellina angularis*, *Bolivina hentyana*, *Spirillina tuberculata*, *Cytheropteron batesfordiense*, as well as several species of *Lepidocyclina*.

The brown marl at Clifton Bank also seems to show some relationship with the Batesford limestone, as both contain several species of foraminifera which, as far as our knowledge goes, are confined in our Tertiaries to these two deposits and others on the Batesfordian horizon. They are:—*Verneuilina ensiformis*, *V. decorata*, *Chrysalidina costata*, *Pavonina flabelliformis*, *Discorbina cruciformis*, *Planorbulina plana*, *Truncatulina echinata*, var. *laevigata*, *Pulvinulina scabra*, var. *umbilicata*, *Calcarina defranci*, *Polytremma minutum*, and *Lepidocyclina tournoueri*, *L. martini* and *L. verbeeki*. I have not met with *Gypsina howchini* in the brown marl, possibly as I have not had an opportunity of examining any of the coarser material from these beds.

The species found are:—

FORAMINIFERA.—*Biloculina bradyi*, Schl.; *Biloculina ringens*, Lam. sp.; *Biloculina depressa*, d'Orb.; *Biloculina irregularis*, d'Orb.; *Miliolina oblonga*, Mont. sp.; *Miliolina seminulum*, Linne sp.; *Miliolina vulgaris*, d'Orb. sp.; *Miliolina cuvieriana*, d'Orb. sp.; *Miliolina trigonula*, Lam. sp.; *Miliolina tricarinata*, d'Orb. sp.; *Miliolina schreiberiana*, d'Orb. sp.; *Miliolina agglutinans*, d'Orb. sp.; *Pentellina angularis*, Howchin sp. *Sigmoilina schlumbergeri*, Silv.; *Sigmoilina sigmoidea*, Brady, sp.; *Haplophragmium sphaeroidiniforme*, Brady. *Textularia abbreviata*, d'Orb.; *Textularia rugosa*, Reuss sp.; *Textularia sagittula*, Defr.; *Textularia siphonifera*, Brady; *Gaudryina rugosa*, d'Orb.; **Bolivina hentyana*, Chapman; *Cassidulina subglobosa*, Brady; *Lagena semistriata*, Will.; *Nodosaria* (D.) *soluta*, Rss. sp.; **Nodosaria* (D.) *obliqua*, L. sp.; **Marginulina costata*, Batch, sp.; *Cristellaria rotulata*, Lam. sp.; *Polymorphina gibba*, d'Orb.; **Polymorphina elegantissima*, P. and J.; **Polymorphina regina*, P. and J.; *Uvigerina tenuistriata*, Rss.; **Sagrina raphanus*, P. and J.; *Globigerina inflata*, d'Orb.; *Spirillina tuberculata*, Brady; *Discorbina rosacea*, d'Orb. sp.; **Truncatulina refulgens*, Montf. sp.; **Truncatulina ungeriana*, d'Orb. sp.; *Truncatulina haidingeri*, d'Orb. sp.; *Anomalina glabrata*, Cushman; **Pulvinulina elegans*, d'Orb. sp.; *Pulvinulina repanda*, F. and M. sp.; **Rotalia calcar*, d'Orb. sp.; *Rotalia clathrata*, Brady; *Calcarina defranci*, d'Orb.; *Gypsina globules*, Rss. sp.; **Gypsina howchini*, Chapman; *Polystomella macella*, F. and M. sp.; *Polystomella*

crispa, L. sp.; *Polystomella craticulata*, F. and M. sp.; **Amphistegina lessonii*, d'Orb.; **Operculina complanata*, DeFr. sp.; **Operculina complanata*, var. *granulosa*, Leymerie; **Lepidocyclina marginata*, Mich. sp.; **Lepidocyclina tournoueri*, Lem. and Douv.; **Lepidocyclina martini*, Schl.; *Lepidocyclina sumatrensis*, Brady sp.; *Lepidocyclina verbeeki*, Burrows and Holland.

OSTRACODA.—**Bairdia amygdaloides*, G.S.B.; **Cythere postdeclivis*, Chapman; *Cytheropteron batesfordiense*, Chapman; *Cytherella pulchra*, G.S.B.

NOTES ON THE MORE INTERESTING SPECIES. FORAMINIFERA.

PENTELLINA ANGULARIS, Howchin sp.

Miliolina angularis, Howchin, 1889, Trans. Roy. Soc. S. Aust., vol. xii, p. 2, pl. i, figs. 1-3.

Pentellina angularis, Howchin, 1915, Idem, vol. xxxix, pp. 348, 351.

With the exception of specimens described by Halkyard from the Blue Marl (Eocene) of Biarritz, under the name of *Pentellina attenuata*,³ but considered by Heron-Allen and Earland to belong to this species, *P. angularis* has only twice previously been recorded, in both cases by Professor Howchin. His records were from the Lower Beds of Muddy Creek, and from a boring on the Lilydale Sheep-station, S. Australia, where it was associated with *Pulvinulina scabricula*, elsewhere a Janjukian species.

The figure shows the usual appearance of examples of this species. The outer walls of the later chambers have, in most cases, wholly or in part disappeared as the result of weathering, leaving the septa dividing the chambers remaining as longitudinal ridges.

ANOMALINA GLABRATA, Cushman.

Anomalina glabrata, Cushman, 1924, Publ. 342, Carnegie Institute of Washington, p. 39, pl. xii, figs. 5-7.

This species has only recently been described by Dr. Cushman, from Samoa, where it is found at depths ranging from 17 to 50 fathoms. It is not uncommon in our Balcombian and Janjukian strata, and also occurs in the Kaliman. I have found occasional specimens in dredgings from the famous "Challenger" station, off Raine Islet, Torres Strait, where so many of the species found fossil in our Tertiaries occur in the living condition.

³ Mem. Proc. Manchester Lit. and Phil. Soc., vol. lxii for 1917, 1919, No. 6, p. 15, pl. viii, figs. 1, 2.

A. glabrata is subject to some variation in the height of the test. Figures 3 and 4 are drawn from one of the stouter examples.

LEPIDOCYCLINA SUMATRENSIS, Brady sp.

Orbitoides sumatrensis, Brady, 1875, *Geol. Mag.*, dec. 2, vol. ii, p. 536, pl. xiv, figs. 3a-c.

O. (Lepidocyclus) sumatrensis, Brady, Newton and Holland, 1899, *Ann. and Mag. Nat. Hist.*, series 7, vol. iii, p. 259, pl. x, figs. 7-12.

Two specimens have been found which I have referred to this species. They correspond with Brady's fig. 3a, and Newton and Holland's fig. 8, which was prepared from a photograph of the example figured by Brady. They also agree with their description of the external characters of this species, *i.e.*, have a sub-globular test, with the rough surface which is found in weathered specimens, and the median edge is produced to form an irregular narrow keel. With the exception of describing the surface as being rough and granular, neither Brady nor Newton and Holland mention the number of comparatively large papillæ which occupy the centre of each face of the test, although fig. 8 of the latter authors shows them very clearly.

In my determination I am supported by Mr. Chapman, whom I take this opportunity of thanking for the assistance he has so frequently and for so long given me.

L. sumatrensis has not previously been recorded from Australian fossil deposits. It is usually found in strata of Burdigalian age. Previous records have been from Sumatra, Java, Borneo and elsewhere. There appears to be some doubt as to whether the species usually recorded under this name from the European Tertiaries is really *L. sumatrensis*, as Lemoine and Douvillé note that the European form never shows evidence of pustules or granules.⁴

OSTRACODA.

CYTHEROPTERON BATESFORDIENSE, Chapman.

Cytheropteron batesfordiense, Chapman, 1910, *Proc. Roy. Soc. Viet.*, vol. xxii (n.s.), pt. ii, p. 300, pl. ii, figs. 7a-c, Idem, 1914, vol. xxvii (n.s.), pt. i, p. 45, pl. viii, fig. 36.

The records of this ostracod are, with one doubtful exception from the Kaliman, confined to Janjukian strata. Typical specimens occur in the Grange Burn limestone, and in brown marl (Lower Beds) at Clifton Bank. I have not met with it in the Balcombian deposits of Port Phillip.

⁴ *Mem. Soc. Geol., France, Palaeontologie*, vol. xii, fasc. ii, 1904, p. 18, pl. I, fig. 14; pl. II, fig. 15; pl. II, fig. 6.

VICTORIAN FERNS

By H. B. WILLIAMSON, F.L.S.

PART V.

All the seven species dealt with here are described in Bentham's *Fl. Aust.* and in Mueller's *Key* as belonging to the genus *Pteris*, but, in Christensen's "*Index Filicum*," the recognised authority on the nomenclature of ferns, only four have been retained in *Pteris*, the rest being removed to other genera.

Genus *PTERIDIUM*.

PTERIDIUM AQUILINUM (L.), Kuhn. Common Bracken (Fig. I, end of a pinna). This is perhaps the most widespread of the ferns, being found in every continent, and in Polynesia. The only part of Australia from which it has not been recorded is the Northern Territory. Hooker says: "In Lapland it just passes within the Arctic Circle, ascending in Scotland to 2000 feet, in the Cameroons to 7000 feet, in Abyssinia to 9000 feet, and in the Himalayas to about 8000 feet." Dr. Spruce has seen it in the Andes 14 feet in height. The form growing in Australia is the variety known as *esculenta*, which occurs only in the Southern Hemisphere. Bentham notes that some specimens from Portland (Robertson) come very near to the typical form. Botanically, *Pteridium* is separated from *Pteris* by its having the pinnule margin thickened, and its sori between a marginal indusium opening inwards and a delicate inner indusium—shown in section in Fig. Ib (x, outer; z, inner indusium). Ia is an enlarged pinnule.

Genus *PTERIS*.

PTERIS TREMULA, R.Br. Tender Bracken (Fig. II, end of a pinna) united by Mueller with the European *P. arguta*, Ait. The distribution is the same as that of the common bracken. The fronds are of a membranous nature, rising usually to 3 to 4 feet, and attaining a degree of firmness when fruiting. The pinnules are mostly opposite, and are more distinctly decurrent on the rachis than in *Pteridium*. The pinnules which show no sign of fruiting are distinctly toothed, and the simply-forked veins are easily seen. The indusium is formed by the incurved margin of the pinnule, and in the advanced stage is concealed by the expanded sori, which are almost continuous, and, unlike *Pteridium*, scarcely



I—PTERIDIUM. II, III, IV, V—PTERIS. VI—HISTOPTERIS.
VII—PELLAEA.

reach to the base of the pinnules. It has been found in all districts of Victoria except the North-west. Fig. IIa, a barren pinna; IIb, a pinna with sori.

PTERIS COMANS, Forst. Hairy Bracken (Fig. III). T., V., N.S.W., Q., Am., N.Z., P. This is a much rarer fern than *P. tremula*, and one easily confounded with that species until the venation is examined, when the difficulty at once ceases, since the veins are copiously reticulate (Fig. IIIa). The sori are usually continued round the sinus (space between teeth or lobes), but rarely to the tips of the lobes, and the pinnules are much more widely decurrent on the rachis than in *P. tremula*. The plant is quite devoid of hairs, and "Net-veined" or "Netted Bracken" is here suggested in place of the vernacular given in the Census. It has been found in the Dandenong Ranges, at Johanna River (west of Cape Otway), Lorne, and various parts of the Otway Ranges.

PTERIS UMBROSA, R.Br. Shade Brake-fern (Fig. IV). V., N.S.W., Q. This differs from *P. tremula* and *P. comans* in not having much-divided fronds. The fronds, from 2 to 3 feet, are pinnate, with 10 to 20 pinnae about 7 inches long, and half an inch wide, usually broader and minutely serrate when barren. The pinnae are broadly decurrent on the rachis, and the veins are mostly forked, and very spreading from the midrib. Though extensively cultivated, it is rarely gathered wild in our State. It has been recorded from Genoa (Mueller), Orbost (E. E. Pescott), and Mt. Drummer (A. J. Maher). (a, enlarged portion of a pinna showing one edge barren.)

PTERIS LONGIFOLIA, L. Long Sickle Fern (Fig. V). V., N.S.W., Q., and all continents. This fern also is rarely gathered in Victoria, the only authentic record being "Mitchell and Buchan Rivers, Gipps Land (F. Mueller)" Fl. Aust., p. 730. The specimens from Buchan are the only Victorian ones in the National Herbarium. It differs from *P. umbrosa* in the pinnae not being decurrent on the rachis, but attached to it by the stalk only. The fruiting is much the same as in *P. umbrosa*. The Buchan specimens are a small form with pinnae only about 3 inches long, the whole frond being only about 9 inches long. Fig. IVb shows a section of a pinna of *Pteris*.

Genus HISTIOPTERIS.

HISTIOPTERIS INCISA (Thunb.) J. Smith. Batwing Fern. (Fig. VI.). N.Z. and all parts of Australia, except W.A. All continents except Europe. Widespread through Victoria, but does not occur in the North West. The fronds

are large, up to 5 feet, twice or thrice pinnate, quite glabrous, with the under-surface often of a greyish blue. The pinnae and pinnules are opposite, and the lowest pair of pinnules are sessile in the axils. The veins are repeatedly forked. The sori are continuous or interrupted, often neither reaching the base nor the apex of the segments.

Genus PELLÆA.

PELLÆA FALCATA (R.Br.), Feè. Sickie Fern. (Fig. VII.). T., V., N.S.W., Q., As., P. Fronds up to 8 inches long, with a stem beset with brown scaly hairs, simply pinnate. The pinnae are somewhat falcate, truncate, or almost cordate at the base, attached as in *P. longifolia*, sometimes placed closer on the rachis than is shown in Fig. VII, pale green on the under-side, rather thick in texture so that the veins are obscure. Sori continuous all round, except at the base. It is found in all districts of Victoria, except the North West. It is a hardy fern, and is often seen in cultivation. The author has a plant which was growing at Pakenham in a rock crevice where very little soil existed. It has survived much neglect during about seven years. (a, an enlarged view of pinna; b, section of half of the same.)

CORRESPONDENCE

PRICES OF PINE TIMBER.

The Hon. Editor,

The Victorian Naturalist.

Dear Sir—

Referring to your December edition—article entitled "Excursion to Greendale"—I beg to inform you that during the period immediately following the war, *Pinus insignis* timber was in keen demand, and prices up to 14/- per 100 feet super in the round were obtained. At present the demand is not nearly so great, pines grown under forest conditions being worth up to 5/6 per 100 feet super in the round. Prices, of course, depend to a great extent on the situation of the timber, accessibility, etc. Present indications are that prices will appreciate in the course of time. Short knotty trees grown for shelter purposes are of little value for timber purposes.

Yours faithfully,

J. STRAHAN, Secretary.

NOTES ON THE GENUS *CORYSANTHES*

BY THE REV. H. M. R. RUPP, PATERSON, N.S.W.

This interesting genus of terrestrial orchids was supposed to comprise only about a dozen species, confined to Australasia. But, according to Dr. R. S. Rogers, nearly 50 species are now recognised, extending from the Himalayas in a south-east direction through the Malay Archipelago, New Guinea, and Australia, to the south of New Zealand. In eastern, extra-tropical Australia I have collected, or received, various forms included under one or other of the following species: *C. fimbriata*, R.Br.; *C. pruinosa*, R. Cunn.; *C. diemenica*, Lindl.; *C. undulata*, R. Cunn.; *C. unguiculata*, R.Br., and *C. aconitiflores*, Salisb. I venture to submit the following notes on these forms in the hope that they may stimulate other observers to assist in clearing up the confusion in which some of them appear to be involved.

We may clear the ground to some extent at once, by suggesting that no challenge can reasonably be offered to the specific rank of *C. undulata*, *C. unguiculata*, and *C. aconitiflores*. The first of these is, I believe, to be formally re-described by Dr. Rogers, and I will therefore not enter into details here with regard to its structure. It was briefly described, with other species, by Robert Cunningham, in 1833, but there is no subsequent record of it in the botanical world until June, 1923—a period of 90 years. The present writer then discovered, on the lower slopes of the Alum Mountain, Bullahdelah, N.S.W., a very small *Corysanthes*, which appeared to be quite distinct from the other known species. Through the investigations of Dr. Rogers, it was finally identified with the long-lost *C. undulata* of Cunningham. It is not uncommon in the locality mentioned. Cunningham's original description may be seen in the *N.S.W. Magazine* (No. 1), 1833, in the Sydney Public Library.

C. unguiculata is well figured by Fitzgerald in Vol. I, part 2, of his classical work. I have only collected it personally at Lindisfarne, Tasmania. Mr. W. H. Nicholls has sent me an admirable photograph of a "colony" growing near Cheltenham, Victoria. Fitzgerald records it in N.S.W., and Dr. Rogers describes it as a South Australian species, so its range is extensive, but it is comparatively rare.

C. aconitiflores is better known to botanists under Robert Brown's name of *C. bicalcarata*, but the rules of nomenclature have restored Salisbury's earlier name. Brown's name

is less appropriate since the re-discovery of *C. undulata*, which is also bi-calcarate. This quaint orchid was common on the slopes of the Alum Mountain, at Bullabdelah. I have also found it at Paterson, N.S.W., and have received it from Tambourine Mountain, Queensland, and Eaglehawk Neck, Tasmania. Its range, therefore, is extensive. There are two distinct forms: one dull-purplish, the other—which is larger and earlier in season—white. The colouring and design of the interior surface of the “helmet” in the white form are exquisite. Miss H. Geissmann has forwarded a fine photograph of a colony of the typical form at Tambourine Mountain.

These three forms are distinguishable without any difficulty. It is otherwise with the three that remain—*C. fimbriata*, *C. pruinosa*, and *C. diemenica*. For the past five or six years I have been trying to satisfy myself as to the specific distinctions between these, and I have not succeeded, though I have formed the working hypothesis that they are probably varying forms of one species which are on their way to become three. Now, I am well aware that in some districts two of them, and in some all three, are so clearly distinct as to discredit this hypothesis. But we cannot argue in this case from the particular to the general. These forms—particularly *C. fimbriata* and *C. pruinosa* as I understand them—have a very wide range in Australia and Tasmania, and cannot be safely determined from one district: they are too variable.

At Low Head, in Northern Tasmania, in 1921, I collected three very distinct forms, which seemed to me to satisfy the requirements of these three species as described. There was *C. fimbriata* practically as we have it in Fitzgerald's Vol. I, Part I. There was *C. pruinosa* equally conforming to the figures on the same plate. And there was *C. diemenica* in agreement with the description in Rodway's *Flora of Tasmania*.

While I was in Tasmania I had little further doubt about *C. fimbriata*, for I never saw the Low Head form elsewhere. But I was soon in difficulties again with the other two; there appeared to be so many intermediate forms that I could not satisfactorily separate them. I may say here—and I believe that in this I am supported by a careful Victorian observer, Mrs. J. G. Coleman—that I cannot attach specific importance to the colour of the “helmet.” It is a question of degree; it varies from translucent-greyish, with purple spots, to wholly dark purple. In Fitzgerald's form of *C. fimbriata* it is probably nearly always dark purple.

Upon returning to N.S.W. early in 1923 I found myself speedily involved in uncertainty between *C. fimbriata* and *C. pruinosa*. The form which I suppose to be *C. diemenica* is rather rare in N.S.W., at all events in the north. But though I cannot say that I have found the exact counterpart of the Low Head *C. fimbriata*, many forms are very close to it. In 1925 I received from Miss H. Geissmann, of Tambourine Mountain, Q., photographs and living specimens which seemed to correspond precisely with my Low Head form and with Fitzgerald.

A correspondence with Mr. W. H. Nicholls, of Footscray, Vic., revealed to me that what I was calling *C. pruinosa* was known to Victorian botanists as *C. fimbriata*, and what I took to be *C. diemenica* was their *C. pruinosa*. In the former determination they are apparently supported by Dr. Rogers' figure of *C. fimbriata* in his *South Australian Orchids*. With every respect for these authorities, I venture to submit that this forces the question, "What becomes of Fitzgerald's *C. fimbriata*?" It certainly exists, for I have collected it, and received it from Queensland. It is certainly not the same form as that which is now known in Victoria as *C. fimbriata*. Nor, I think, is the latter quite identical with Dr. Rogers' plant, for he describes it as having a crimson labellum, whereas in the Victorian form that segment appears to be mainly white. A crimson-purplish labellum is characteristic of my specimens from Low Head and Tambourine Mountain, as of Fitzgerald's figure; but Dr. Rogers' flower lacks the very long and striking fimbriae of these others.

It appears to me that, if we eliminate the labellum for the moment, the differences in structure and habit between all these forms are not very great. I do not think they would be recorded as three distinct species on the ground of these differences. Now, with regard to the labellum, the distinctions are mainly those of contour. Colour is notoriously unsafe as a scoring-point for the determination of species. As to contour, we have two extremes—the very long expanding fringes of the form I have called *C. fimbriata* above, and the incurved, minutely denticulate margin of the form I have supposed to be *C. diemenica*. In between is the expanding form, acutely and prominently denticulate, which I have called *C. pruinosa*. Retaining these names—rightly or wrongly—for the moment, in Tasmania I found intermediates between *C. pruinosa* and *C. diemenica*, which strongly suggested that they were variants of one species. In New South Wales I find similar intermediates between *C. pruinosa* and *C. fimbriata*. I hesitate to propose any one of the three as the "parent," but as far as I am able to

judge, the form I call *C. pruinosa* is the most widely distributed, though not in some districts the most abundant.

With some diffidence, therefore, and at present merely as a finger-post towards further investigation, I suggest that in *C. fimbriata* and *C. diemenica* we have variants (in opposite directions) from *C. pruinosa*, which are in process of evolution into distinct species. Perhaps they have actually reached their goal, since they do not seem to extend beyond these forms; but the continuance of so many intermediates renders it difficult as yet to definitely separate them from the medial type.

The length of this paper debars me from discussing the interesting habit of some *Corysanthes* of greatly elongating the stem after fertilization. I have only personally observed this in the form I have assumed to be *C. pruinosa*, and in *C. undulata*.

CORYSANTHES OR CORYBAS?

In plant nomenclature priority of naming is usually considered to govern the naming of plants. Thus the first name given to any plant is assumed to be its rightful name. Sometimes the rule is varied, especially if there be good reason for so doing.

In regard to the genus *Corysanthes*, this race of plants was first known as *Corybas*, having been so named by Salisbury. In the *Victorian Naturalist*, Vol. XL, No. 12, April, 1924, page 238, I drew attention to the fact that R. Schlechter, in a revision of the genus *Corysanthes*, in Fedde's "Repertorium Spicicum Novarum Regni Vegetabilis," published in March, 1923, had placed all *Corysanthes* under the earlier name of *Corybas* on account of priority of naming.

If priority alone is to count, we must change the name of this genus which we have so long known as *Corysanthes*. Salisbury's name of *Corybas* was, however, very well known to Bentham when compiling the "Flora Australiensis." Over 50 years ago, Reichenbach, jr., had revived Salisbury's name, but Bentham refused to accept it on priority only, stating that the name *Corybas* was "universally rejected as having been surreptitiously figured and described." According to Bentham, Salisbury had access to a drawing by Bauer from R. Brown's specimens, and so described and named the plants.

So the question now is: Shall we adopt the first name, according to the law of priority, or retain the second and more familiar name—the name given fairly and squarely to the plant?—ED. E. PEScott.

Field Naturalists' Club of Victoria

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P. R. H. ST. JOHN, and F. E. WILSON, F.E.S.

EXCURSIONS.

SATURDAY, MAY 8.—Black Rock. Object: General. Leader: Mrs. Coleman. Meet at Flinders St. in time for 1.25 p.m. train.

SATURDAY, MAY 15.—National Museum. Object: Fossils. Leader: Mr. F. Chapman, A.L.S. Meet at Museum 2.30 p.m.

SATURDAY EVENING, MAY 22.—Social Evening. The President and Mrs. Coghill invite the members to a social evening at their residence, 17 Monomeath Avenue, Canterbury.

MONDAY, JUNE 7 (King's Birthday).—Mount Evelyn. Object: General. Leader: Mr. G. Coghill. Meet at Flinders St. in time for 8.7 a.m. train. Lunch should be taken.

SATURDAY, JUNE 19.—Herbarium.

Field Naturalists' Club of Victoria

ROOMS--ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th JUNE, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—

Miss Cottrell
30 Davis Avenue,
Sth. Yarra

Miss E. Powles
49 Rowell Avenue,
Camberwell

Miss M. E. Smytheman,
30 Davis Avenue,
Sth. Yarra

Miss Edith Raff
Cotham Road,
Kew

Mr. W. H. Nichols
132 Geelong Road,
West Footscray

PROPOSER:

Mr. F. G. A. Barnard

Mr. E. E. Pescott

Mr. F. G. A. Barnard

Mr. G. Coghill

Mr. Williamson

SECONDER:

Mr. F. Pitcher

Mr. G. Coghill

Mr. F. Pitcher

Mr. Williamson

Mr. Barrett

AS COUNTRY MEMBER—

Mr. D. Orchard,
Kingslake

Mr. Oke

Mr. Williamson

3. Nominations for Membership.

4. General Business.

Annual Report.

Election of Office-bearers and Committee, 1926-27.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Do not forget that notes are needed for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. By Mr. J. A. Ross—

"The Amoebae—Their Structure, etc."

Members are particularly requested to bring exhibits.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence, or see anything of interest in Foreign or Colonial papers, are requested to inform the Secretary of the same, that he may arrange for their bringing them before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

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JUNE 5, 1926.

No. 510.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, May 10, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about 50 members and friends were present.

REPORTS.

Reports on excursions were given: Botany School, University, Mr. Blake; Macedon, Dr. C. S. Sutton and Mr. L. Hodgson; Black Rock, Mrs. E. Coleman.

ELECTION.

On a ballot being taken, Miss Embling, 258 High Street, Malvern, was elected as an ordinary member; Mr. J. D. Long, Union Bank, Stawell, as a country member; and Mr. W. Mitchell, Jun., Rivernook, Buffalo River, as an associate member, of the club.

GENERAL.

The President extended a hearty welcome to Mr. and Mrs. Elliott, members of the Field Naturalists' Section of the Royal Society of South Australia. Mr. Elliott responded.

Mrs. E. Coleman read a proposal to form an Orchid Research Section, within the Club, having for its objects the collection of data and study of orchids. On the motion of Mr. E. E. Pescott, seconded by Dr. Sutton, the matter was referred to the Committee.

ELECTION OF AUDITORS.

Messrs. C. A. Lambert and H. Hughes were elected as Auditors for the year, on the motion of Messrs. C. Oke and H. B. Williamson.

OFFICE-BEARERS FOR 1926-27.

Nominations were made as follows:—

President—Mr. Geo. Coghill (proposed by Mr. F. G. A. Barnard, seconded by Mr. A. J. Tadgell); Mr. E. E. Pescott (Messrs. F. E. Wilson and D. Dickison).

Vice-Presidents—Mr. A. E. Keep (Dr. Sutton and Mr. Barnard); Mr. P. R. H. St. John (Messrs. Audas and Oke).

Hon. Treasurer—Mr. A. G. Hooke (Messrs. Oke and Williamson).

Hon. Librarian—Dr. C. S. Sutton (Messrs. Barnard and Oke).

Hon. Editor—Mr. C. Barrett (Dr. Sutton and Mr. Barnard).

Hon. Secretary—Mr. C. Oke (Messrs. Rodda and Audas); Mr. L. Hodgson (Messrs. Tadgell and Barnard).

Hon. Assistant Secretary and Librarian—Mr. H. B. Williamson (Messrs. Oke and Pescott).

Committee—Mr. J. W. Audas (Messrs. J. Wilcox and V. H. Miller), Mr. F. Chapman, A.L.S. (Messrs. D. Best and Barnard), Mr. C. Daley, B.A., F.L.S. (Messrs. Pescott and F. Pitcher), Mr. J. A. Kershaw (Messrs. Best and Barnard), Mr. V. Miller (Messrs. Williamson and Daley), Mr. A. E. Rodda (Mr. Pescott and Dr. Sutton).

PAPER.

By Mr. A. J. Tadgell: "Mount Fainter and Beyond." The author gave an account of a recent trip to a little-known portion of the Australian Alps, where interesting, rare and unrecorded plants were collected, as well as fossil remains of plant life at 5360 feet above sea level. The paper was discussed by Dr. H. Green and others.

EXHIBITS.

By Mrs. E. Coleman: *Pterostylis pedoglossa*, Fitz., and *Leptoceras fimbriatum*, Lindl., from Black Rock, 8/5/26.

By Mr. T. Greaves: Sea shells from New Guinea.

By Mr. V. Miller: Stone axe, found in St. Kilda.

By Mr. C. Oke: Frogghoper from Sugar-ants' nest, at Hattah.

By Mr. W. H. Nicholls: The Brittle Greenhood, *Pterostylis truncata*, Fitz., from Tottenham, Keilor Plains, a new district. Plants are very numerous at present, but are difficult to locate. These specimens differ from the You Yangs type, being much smaller of flower, and darker in colour.

By Messrs. A. J. Tadgell and A. G. Hooke, from Mount Fainter: Water-worn stones from old alluvial bed, a few feet under the summit of South Mount Fainter, 6,000 feet above sea level. Plants: *Agrostis Muellieri*, *Euphrasia antarctica*, and, to compare, *Euphrasia collina* (var. *alpina*), *Alchemilla vulgaris*, *Juncus falcatus*, *J. pusillus*, *Heleocharis multicaulis*, *Scirpus crassiusculus*, *Geranium sessiliflorum*, *Pratia puberula* (*Lobelia Benthamii*), *Carex stellulata* (*C. echinata*), *Muehlenbeckia axillaris*, *Callistemon Sieberi*, *Scleranthus mniarioides*, *S. biflorus*, *S. diander*, *Exocarpus nana*, *Astelia alpina*, *Nertera depressa*, *Pentachondra pumila*, *Stackhousia pulvinaris*, *Aciphylla glacialis*. Specimens of fossil plant remains found

on the Bundarra River, at 5.360 feet. From among the foliated clay Mr. F. Chapman identified some nine different plant remains. There was also a specimen of coal from the same bed.

By Mr. A. L. Scott: Exhibit illustrating the nature of polarisation colours such as seen in thin sections of minerals and in oil films on wayside puddles. *Note*: On the stage of the microscope is a plate of quartz. If both nicols be in position, and one rotated, we observe a display of brilliant colours, yellows, blues, violets, purples. The quartz itself is colourless. The nicols are also colourless. The colours therefore arise from some change that takes place in the light itself on its way from its source to the observer's eye. If we examine the colours with a pocket spectroscope, also on the table, and rotate either nicol simultaneously, we will, if our adjustments are correct, see a dark band travelling from end to end of the spectrum as rotation proceeds. Any particular position of this band may be compared with any particular tint. The colours therefore arise through the absence from white light of certain constituents. In this particular case the absence arises from a property of quartz known as Rotary polarisation: A brief explanation of this phenomenon may be found in Cross and Cole's "Modern Microscopy," p. 226, in the 1912 edition. For explanation as to how this absence is brought about in the cases of thin slices, reference may be made to Cross and Cole, as above, pp. 219 et seq.

By Mr. H. B. Williamson, F.L.S.: Flowering specimen of *Thryptomene Miqueliana*, F.v.M., the Dotted Heath-myrtle collected by Mr. F. Barton, Jun., at Sperm Whale Head; also young plants of same (distributed to members of the Club).

THE PRESIDENT'S HOSPITALITY.

The happy thought of the President and Mrs. Coghill to invite the members of the Club and friends to an informal gathering at their home, "Nariel," Monomeith Avenue, Canterbury, on Saturday evening, May 22, resulted in a representative gathering. Conversation and inspection of various objects of interest collected by the host and hostess in various parts of Australia, musical items and a lecturette by Mr. Frank Baker on the "Activities of the Ether of Space," made the time pass quickly. A hearty vote of thanks to Mr. and Mrs. Coghill was followed by the singing of "Auld Lang Syne."

Mount Fainter and Beyond

BY ALFRED J. TADGELL.

When on Mount Bogong, two years ago, Mr. A. G. Hooke and I planned the trip of February, 1926, to reach Mount Fainter and the Tawonga Hut beyond. Although the distance from Melbourne is only 135 miles, it is necessary to travel by rail to Bright, 200 miles, thence by motor car 24 miles, rising to 2000 feet at the Tawonga Gap and falling again to 1200 feet into the valley of the Kiewa; then continue on horseback for a further 20 miles. There is no regular conveyance between Bright and Tawonga. The road is good, and rises by tiers to the Gap, so that one appears at times to see three parallel roads and almost right-angled bends.

Although not far from "the haunts of man," we were pleasantly surprised to see a fine male Lyre Bird, *Menura superba*, race along the German Creek road, in front of our car, for nearly 100 yards before leaving to hide in the bush. Tawonga will not always be one of the outback places, for the Railways Standing Committee has just completed taking evidence with the view of constructing an iron road up the fertile valley, perhaps direct from Albury, on the main line, when glorious Alpine country will become more accessible.

Wake up, Victorians, to your Alpine beauty spots. Their charm lies in the fact that you get away from civilisation into the beyond. How many of you know of the infinite grandeur beyond the Buffalo Plateau, whose highest peak is 5645 feet? Unknown beauty spots are to be found in the Alps, which are thus briefly referred to in the "Year Book of Victoria:" "The highest mountain in Victoria is Mount Bogong, situated in the county of that name, 6509 feet above sea level; the next highest peaks are Mount Feathertop, 6306, Mount Nelson, 6170, Mount Fainter, 6160, Mount Iltham, 6100, Mount McKay, 6030, and Mount Cope, 6027; all in the same county," and comparatively close together, "while the Cobboras, 6030, are situated between the counties of Benambra and Tambo."

To reach the Tawonga graziers' hut, at 5550 feet above sea level, Mount Fainter is crossed by the Kiewa-Omeo surveyed track, and so is the well-watered "Little Plain"

adjoining. The spurs are dry for 6 miles out of Tawonga, then the traveller will find water at convenient intervals, although he follows along the crest of the mountain ridges to Mount Fainter; afterwards, creeks and springs will be met with frequently. On the High Plains beyond Mount Fainter, in a normal season, there is abundance of water on either fall. The High Plains are known to stockmen as the Fainter High Plains, although marked Bogong High Plains on the maps. Mount Bogong is 15 miles from them, while Mount Fainter is about half that distance. There is reason, therefore, on the side of the stockmen, who range over these High Plains in summer and autumn, and know them well.

The Tawonga Hut (15 x 14 x 18 feet), distant 7 miles from Mount Fainter, is strongly built with an iron roof, and shelters under granite rock masses, showing wide bands of quartz. From this rock, overhanging the hut, there is a pleasing outlook over the creek valley, which will probably, in the near future, be made a reservoir by the Kiewa Hydro Electric Scheme, that primarily is a means of increasing the supply of electrical energy to the metropolis. Other graziers' huts, dispersed at not great intervals from the Tawonga Hut, are Blair's, $4\frac{1}{2}$ miles distant; Dibbin's, 6; Wallace's, 6; Roper's, 9; Kelley's, 10; and Fitzgerald's hut, 14 miles. Let me, however, add a word of warning. Distance is largely a question of accessibility, rather than of measurement. Some of these huts may be found inconveniently placed, and somewhat difficult of access.

After leaving Tawonga, 1200 feet, we climbed up a dry watercourse, not too dry, however, for the fern *Dryopteris punctata* to hold its own in and around Mount Beauty, 2265 feet. Our attention was attracted to the bold outline of Mount Bogong, separated from us by about 7 miles of valley of the intervening East Kiewa. The play of light and shade caused innumerable spurs and valleys to stand out prominently, and many pleasant recollections were awakened of two visits and our climbs in and over those distant ridges (see *Vic. Nat.*, Vol. 41, Aug., 1924). What a panoramic picture we could have taken had we known that on our return, 10 days later, Mount Bogong would have been obscured by bush-fire smoke, of which as yet there was no hint. About 6 miles out of Tawonga there is water at the stock camping ground, and cool forest conditions become apparent.

A few flowers appeared and we saw Gang Gang cockatoos, *Callocephalus fimbriatus*, disturbed from feeding on the seeds of the Bitter Hop-Pea, *Daviesia latifolia*, of which they are very fond. Not content with the seeds, however,

these birds had partially stripped the leaves from the bushes and left them underneath. This Hop-Pea is known as the basis of a patent medicine. It is useful to bushmen as a drench for worms in their horses; but they will not feed their stock upon it for any length of time, as hungry stock may suffer from its effects. Hickory Wattle, *Acacia penninervis*, appeared in the broad-leaved form, and the variety *falciformis*, whose large juvenile bipinnate leaves have more than once caused me to leave the track, to look at what I thought was a novelty. *Senecio dryadeus (Australis)* was prettily in flower down the slopes.

Bogong Jack's Hut, 12 miles from Tawonga, at 5330 feet, was reached in time for late lunch. Bogong Jack's identity has not been disclosed, but his exploits are still remembered and perpetuated by the name given to his former habitation, which, on being burned down, was replaced by the present, substantial, shingle-roofed structure, built on a small flat portion of the range, that falls steeply away on the west side towards Bright, and again on the east side towards Mount McKay. Graziers have also erected hurdle yards for resting the cattle, in proximity to an easily-found spring, on the right-hand side. This has been so much tramped over lately that a bucket is difficult to fill, and the water is not so clear as elsewhere. At this spring, while filling the billy, our guide met an unwelcome companion and threw the contents over a copperhead snake which seemed loath to leave until thus politely requested. Of copperheads, *Denisonia superba*, we only saw one other specimen, and that near our hut at 5560 feet, but unfortunately we failed in our attempts to kill it. One wonders how these reptiles exist at such an altitude, but, as they hibernate during the cold and snowy weather, it is presumed "that Nature tempers the wind to the shorn lamb."

Mount Fainter was now a mile distant, and the traveling became very rough. From the sideling along which our track wound a splendid view was obtained north-west looking back down the West Keiwa valley and westward over the Ovens in the direction of Bright and Freeburgh. Our guide saw a fire starting near his home, and was caused some anxiety. Ten days later this fire was still burning fiercely, shrouding the Tawonga valley in a dense pall of smoke. At Bogong Jack's saddle, about midway between Bogong Jack's Hut and North Mount Fainter, the surveyors have brought the track over from the western to the eastern slope. Here some unpleasant climbing was experienced, but at each frequent halt a wonderful panorama excited

admiration. As we stood there we felt it would be many a day yet before the mountain fastnesses would be disturbed by the noise of the motorist and the spirit of the mountains chased away.

It became necessary to dismount and give our horses as long a rein as possible. The footing was difficult for man and beast, even when walking up the large fixed, and nearly as large, loose stones on the ungraded track. "Steps of Stairs" this portion of the track has been called for a good half-mile, but the steps are irregular in height and size, and the stairs are "greasy," whether going up or coming down. We did not mind the time taken or the care necessary now, but it was just as well that the bush-fire did not catch us hereabouts on our return. In due course Mount Fainter was reached. Two peaks mark the summits. North Mount Fainter, at 6160 feet, and, about a mile distant, a little to the east, South Mount Fainter, 6000 feet. It is clear, says the late Mr. R. A. F. Murray, that the ranges forming the ancient watershed lines, of which Mounts Feathertop, Hotham, Cope and other mountains are probably remnants, were even of far greater elevation than they are now, and have been reduced by denudation hundreds, perhaps thousands of feet, during the time that the same action has taken to érode the deep valleys at their bases.

At the north end of the range, from what remains of the cairn on the highest point and just at the edge of the mount, there are glorious "glimpses of unstudied natural splendour." North of west 25 miles are the serrated Buffalo mountains, and, like clouds on the south-west horizon, the rugged Mounts Cobbler, Howitt and Buller. Four or five miles east are the pointed Mount McKay and the massive Mount Nelson; while beyond them, far away, are Mount Kosciusko and sister ranges. At our feet the awesome gorge of the Kiewa, some 3000 feet below, separated us from Mount Feathertop that we know so well (see *Vict. Nat.*, Vol. 38, Feb., 1922), here seen buttressed up by a long spur. Often we had gazed on Fainter's bold granite and basalt outlines, and had picked out with our glasses the two cairns, wondering, like many other people, what lay "on the other side of the hill."

To climb down the steep slope of Fainter and up the long Feathertop spur to the recently-erected chalet, two miles over the top, would, we considered be not too difficult an undertaking. We knew something of these spurs, and had essayed Blair's hut from the other side in 1922; but when one climbs down these mountain slopes for more

than a mile they are found to be disrupted and, apparently interminable. Then the unknown holds one back, and, just where one would succeed, one fails in the final effort. We had climbed down the "hut" spur under the Razorback, and got close to the rocky bed of the Diamantina—but the unknown—so we returned on our tracks. Blair's hut can be reached from Feathertop, and so can the Tawonga Hut, under the High Plains.

This season was not a normal one, and, although no fires had so far reached up its slopes, Mount Fainter might not in fairness be judged from what we saw of it. The watercourses of the now dried-up springs had cut deeply into the mountain-sides, where Orites, Silver Daisy, Marsh Marigold and Cushion Carraway abounded. The pile carpet-like sward of *Poa caespitosa* gradually fell away for 160 feet till South Mount Fainter was reached. Here, marking the second summit, was the usual cairn and, like a playground of the gods, an elevated flat of some 30 feet x 15 feet, very evenly paved with basalt cobble-stones. As was our custom, we rebuilt the cairn. On this summit were mountain plants, such as the Snow, Coarse, and Fringed Daisies; white Hoary Sunray; the Snow Bent, and Bristle Grasses; the Alpine form of the Wallaby Grass; Knawel; dark, stout, ovoid-headed Woodrushes, so unlike the neat *Luzula campestris* of the lowlands.

Under the summit, some 15 feet, 20 years ago a party of miners had driven a tunnel on the alluvial bed, and, according to reports, had won good gold. The winter at 6000 feet is severe, as snow may fall at any time between the months of March and November; consequently, work was suspended till the following spring, and later abandoned, when, on attempting to resume operations, it was found that, for want of timber, the drive had fallen in. This alluvial is significant, as it points to the existence of an ancient river at a considerably relative higher elevation than the river-beds of the present day (Report V, Geo. Survey, Vic.). It was conjectured by the late Mr. Murray that a river ran south-east from Mount Fainter and connected with the fossil-bed formation on the Bundarra River, 9 miles away; whereas the Kiewa, nowadays, runs almost due north. It is even thought that the river was the Dargo, which, in times past, might have had its course near Mount Fainter, instead of under Mount Hotham, 15 miles distant at the present time. Mr. F. Chapman has identified, among the water-worn stones I brought from the alluvial workings of Mount Fainter, lydite, quartzite, quartz-felsite, feldspathic-gneiss, and schist.

What is known to the stockmen as the Fainter Range runs for a mile long by 3 miles in width. Well down on either side are found rushing waters that swell one branch or other of the Kiewa, and might well constitute small independent rivers. Interesting plant life is found from 2-300 feet under the mount, and a marshy flat spreads out on the south side. In the sandy gravel are found dwarf epacrids, with the dark, chocolate-lined *Prasophyllum*, *exocarpus nana*, the Alpine-flowered and Rope-Rushes, and *Richea*, with long, creamy flowering spikes. Here, and also near the hut, we found plentifully the aster, *Olearia ramulosa*, var. *communis*, now merged in *O. floribunda* (Benth.). The stream that runs through this marsh was turned into an adjoining valley by old-time miners, and, over the rise a mile distant, the confused banks tell their own tale.

We had considerable difficulty in tracing the origin of the name given to Mount Fainter. Many, including local sources from which we had expected information, yielded no help; but, as usual, our guide knew his district. It would appear that, in the early days, there was a man "partial" to horses, who worked between Omeo and Tawonga, and, on one occasion to avoid an "interview," he was hard-pressed on foot, to get to his hut, on a flat near the top. He had nearly succeeded in reaching the summit, when he fell, exhausted; and, on coming round, he explained that the steep mountain side had put too great a strain on his heart. It is also fittingly added, that he and a mate lost their bearings in one of the fogs common to these altitudes, and separated, each going in the direction in which he thought the hut lay. The mate reached the hut, but the "hero" was never heard of again.

Hazlitt says that nicknames have governed the world and set in motion man's prejudices, doing their work more effectually than reason, besides getting through their job with the least time and trouble. Such were our thoughts as we reflected on the origin of the names Feathertop and Fainter. Feathertop's name might have originated from the feathery cloud that is sometimes seen over its summit, or from the feather-edge of the razor-back approach to its cairn. The latter is, indeed, so apparent that, on my first attempt to get to its top, I decided to climb up a very steep side rather than take the direct track up its narrowing crest. What a name to bestow upon such a splendid mass of Nature's handiwork, a creation of countless miles of graceful spurs and buttresses, when Feathertop is viewed in the distance from the Bright-Harrietville road! Fainter, also—how inadequate and expressionless a name for majestic

and rugged beauty! In both cases the prejudice of false impressions haunted the imagination, so that idea and association could not disconnect them.

Leaving the well-watered "Little Plain" at 5700 feet, and the grassy mustering-flat close to Mount Fainter, there are two tracks that lead to the Tawonga Hut and Fainter High Plains. One, open, though rocky and more suitable for the packhorse, continues along the rough surveyed track, passing "weeping rock" through a huge, rugged and sterile granite range—little short of 6000 feet—to the stock-yards, under "Nigger head," and the snow poles, when the hut may be seen. The newer deviation by which a mile and a half is saved, branches off at the creek, all upturned by the miners. A dilapidated building alone remains of the once-busy camp. While resting, we watched a fine fox lope along within easy range of a gun, and disappear into the bush again. Two beautiful streams were crossed, and the track, though good, was somewhat inconvenient from overhanging and fallen bushes. Snow Gums, *Grevillea victoriae*, and *Olearia flavescens* hold sway, and, along the granite-strewn track for nearly a mile, bushes of *Boronia algida* were met with for the first and only time, in company with the scaly *Phebalium squamulosum*. This was the only *Eriostemon* seen, excepting the leathery *Pleurandropsis trymalioides* collected on the Pretty Valley fall of the High Plains. The former species likes some little protection, while the latter prefers the exposed uplands, and this is seen in the adaptability of the forms of the leaves in both species.

Quite unexpectedly, the hut was reached on turning the corner of the track, close to an ideal mountain stream. At the hut there was a great commotion, and we counted 200 crows in one flock. This was the greatest number of these birds seen by us together, yet they did not appear to be hungry, as the carcase of a beast had lain untouched for a week outside the stockyard.

From the hut, at 5500 feet, we made several excursions down the rushing mountain stream, which becomes an affluent of the east branch of the Kiewa, and help that river on its journey of 85 miles. In its course over a rocky bed, sand and stones have worn many large, circular holes two feet deep. Robust bushes of stout, golden-headed *Callistemon Sieberi*, with elongated filaments and rich-coloured flowers of the Trigger Plant were seen, as well as pale, rose-coloured Austral Bluebells, unusual, I think, and somewhat a misnomer here. The very rare *Alchemilla vulgaris* lined the banks at frequent intervals, showing the

“ladies’ mantles” in yellowish-brown profusion; and in their company was the rare rush, *Heleocharis multicaulis*. A scale and a fungus were found, and have been kindly identified by Messrs. C. French, junr., and C. Brittlebank. That collected on *Callistachys (oxylobium) ellipticum*, among the rocks in dry places, was the white mussel-scale (*Chionaspis Eugeniæ*), with pretty, white, dispersed spore sacks, not unlike coral. The luxuriant *Brachycome decipiens*, overhanging the water’s edge, with large flowers on a long scape, bore on its leaves and stems the æcidium of *Puccinia Brachycomes*. The latter was a clustered, cup-like fungus of pretty orange colour, with dusky membranous edges. My own *Brachycome*, with toothed leaves, was very common, and quite at home in the mud of the rocks, as it was in the grassy depressions adjoining.

Among the rock crevices and on the banks, grew the rare *Juncus falcatus*, and the rarer *Carex echinatus*. The former has blackish inflorescence and black-tipped, grey-green, grass-like foliage. The *Carex* will now have to be added to the Club’s Census. Fine specimens of the tea-tree *Leptospermum lanigerum*, worth all the effort to reach them, were growing 100 feet lower. We did not find any large waterfalls as expected. It is not an easy matter to climb for a mile up and down the bed of an alpine creek. We passed small waterfalls, cataracts and tempting Venus’ baths as we went swinging from one side to the other, by means of perhaps the best specimens I have ever seen of the Mountain Plum Pine, *Podocarpus alpina*, with stems that measured 8 inches in diameter. This always reminds me of a dwarfed and spreading Japanese Pine, of pot culture.

Ferns were scarce, excepting the Alpine Blechnum. The Tunbridge Filmy Fern was met only once, on a cool rock-face, close to a waterfall. The small form of *Hypericum japonicum*, perhaps confined to the Alps, was abundantly in flower. It seemed an intenser green than the large form of the lowlands, and a water-lover, which does not characterise the var. *graminea*. Sphagnum beds abounded, and, in them, odd-flowering specimens of the Veined Sun Orchid. Orchids were rare, owing perhaps to the season. The prasophylla, called by Dr. Rogers after the two male members of our Club, were the exception. The common Bird Orchid was difficult to locate, as it hid in the underscrub, as is its wont in these parts.

Less than a mile from the Tawonga Hut, on the hill-side leading up to the High Plains, there is, at 5800 feet,

a curious basalt formation, which we termed "Our battery." Thirty or more columnar stone slabs, or logs, as the late Mr. Murray would have called them, are to be seen together. These stones are about as long as a house windowsill or stone step, and as truly shaped as if cut for some purpose with the chisel, and then abandoned. They are four, five, and even six-sided, and lie half embedded in the earth, looking in the distance like guns elevated into position ready to be fired. It needed little imagination to see gunlayers' work of a howitzer battery; each gun had a recoil jacket on top and below, while, to complete the illusion, the balls for charging the numerous guns lay around. These stones are uneven on their surfaces, and render the slope of the hill difficult of approach, as, in walking over them, one needs to be careful of foothold, owing to the Mountain Plum Pine concealing the spaces between them.

Sometimes an unexpected pause, or an obstacle, will provide a prize for the natural history student. It was in this way that, hereabouts, we found a number of specimens of the rare *Geranium sessiliflorum*, just going out of flower. This plant is a good example of pilosism, as the leaves, in this exposed position, are thick and rough-hairy, while hydrotropism is seen in the long, thick, tap-roots, suggestive of difficulty in the search for moisture in such a season as the present one. Beyond "Our Battery" on the High Plains, about $2\frac{1}{2}$ miles from the Tawonga Hut, a prominent feature on the landscape is Mount Flora, or "Jim," as the locals call it in contradistinction to "Jack," their name for Mount Cope, $2\frac{1}{2}$ miles further to the south. Mount Jim rises to 5900 feet—the extreme height of the High Plains—and, at a distance, attracts attention because of the pleasing appearance given by its cover of Snow Gums, Hovea, and other shrubs. Masses of Hoary Daisy bushes and the Alpine Mint Bush, both a wealth of large, whitish-pale blue coloured flowers, created a veritable floral feast such as might well adorn a cultivated garden. These, with the Mountain Plum Pine, covered the lower rock formations, extending for many acres around. One marvels again whence come these untold square or several-sided blocks of basalt, in such shapely sizes. A closer examination of Mount Jim revealed two large vent-like openings—huge quarries in appearance—on two sides, as though masons had been at work for months with square, chisel and maul. Our guide called the openings craters of extinct volcanoes. They are certainly like them, but the late Mr. Murray refers to similar basalt formations as landslips. Their low height now would not give that impression to the layman, who

looks for some reason why the large openings are circular, and asks whether frost could split up the basalt so evenly. No doubt the landslips occurred ages prior to the time when the fluvial and atmospheric actions sculptured the country to its present form. Once again we found difficulty in walking over the stones from which the water had washed all traces of earth. But they certainly are useful to drain the slopes.

Snow poles, 10 feet in height, at frequent intervals mark the track from the Tawonga Hut, at 5500 feet, across the wide flat, furrowed in many places by our creek and its branch. Mountain Heath-myrtle, acres in extent and flowering in wild profusion, is a source of attraction to countless small lepidoptera, whose name we could not ascertain. We thought that we had sent good specimens, but our inexperience as entomologists evidently put the specimens out of court for identification. We passed the slip-panels and large stockyards, capable of holding 1000 beasts and more at one time, and the line of snow poles wound out, with the "Nigger Head" on our right, to the High Plains, at 5700 feet. Our minds try to picture the autumn mustering of the 8000 to 10,000 head of cattle now on the Plains: the noise of men, of their cracking stockwhips, the barking of dogs and lowing of cattle, as mobs, with all kinds of brands, are cut out and allocated to the many owners. The first snow is the warning to collect the stock. Snow, at time, comes unexpectedly early, when a way must be dug through the soft drift, and the track exposed for the mile-long string of cattle trekking back to the lowlands. The "Nigger Head" range, so named because the basalt outcrops resemble tousled black hair, rises to 5900 feet and overlooks our hut, also the West Kiewa, Mount Feathertop, and its extension along the Razor-back. It was the "Nigger Head" we climbed to watch, with misgivings, the progress of a bush fire that swept up out of the valley, 2000 feet below, over this range, well down our side, and caused us dam the creek, carry water to the hut, and prepare bags for beating out the invader. Twice we sat up till midnight, watching till the fires had sunk low. We found that the fires consistently burned at their lowest at midnight, but the smouldering, thick root-stock of the grass held the fire, which revived with the morning breeze.

On arriving at the High Plains the snow pole line divides, one branch turns to the right, zigzagging and skirting the opposite bank of the Nigger Head Creek and along the Kiewa under Feathertop, with numbered poles, till Dungey's track is reached. This track commences at Free-

burgh, near Bright, winds up the deep gorge of the Kiewa, and continues towards Mount Hotham and over the Cobungra Gap. It is worth while turning off Dungey's track, near Blair's hut, to look at the small, tarn-like lake, with its three precipitous rocky sides and moss-bed outlet. The left-hand line of poles extends across the High Plains, past wooded Mount Jim, to the dome-shaped Mount Cope, 5 miles out, and still beyond, heading towards Glen Wills.

On the High Plains we had expected open, grassy, flat country, and were considerably surprised to find a very undulating area, some 7 miles by 3 miles, exposed, almost treeless, and generally grassy, but sometimes rocky and difficult to walk over. The Plains rise to 5900 feet, but fall away 3 to 400 feet into Pretty Valley, and, about 2 miles further on, into Rocky Valley. The former is about $1\frac{1}{2}$ times the extent of the latter, and together they aggregate some 12,600 acres, which, it is probable in the future, will be converted by the Electric Scheme into what will prove two beautiful lake-like reservoirs, by means of high dams, 68 feet and 55 feet above the river-bed. At present there are two survey camps collecting data for the Electric Scheme—one under Mount Feathertop and the other near the Pretty Valley, under Mount McKay. I am indebted to the Electricity Commissioners for use of the map attached to their 1920 report, to serve as a guide to the locality. The East Kiewa, which flows through the valleys and runs over a rocky bed of gneisses, mica-schists, and quartzite, is nearly the same size as the Watts at Fernshaw, or the Badger at Coranderrk, without the overhanging vegetation.

We found much to interest us in the well-named Pretty Valley. A brace of duck rose from the river at our approach. Beautiful locustidæ of electric-blue sheen and with lanky magpie-coloured legs, lazily showed off their colour and balloon-like wings and invited further inspection. In fact, many natural history objects insisted on attracting attention. Rare plants were gathered, such as *Ranunculus Millarii*, *Pratia puberula* (*Lobelia Benthamii*), interwoven with tiny rush, *Juncus pusillus*. *Herpolirion Novae Zealandiae*, in damp ground, was a picture of large, pale-blue, almost stemless, flowers, rising out of the rigid, grass-like leaves. The pretty violet-streaked *Euphrasia antarctica* was found, and will also have to be now added to our Censur. A part of the Pretty Valley, under the High Plains, is a huge moss-bed, and innumerable mountain trout, *Galaxias*, seemed quite oblivious to the drying water-pans, in which we found

in flower the rare rush *Juncus crassiusculus*, and its close sister, *J. fluitans*.

We wandered leisurely over the Plains past Mount Jim, and so "home." *Stackhousia pulvinaris*, another rare plant (just finishing flower), revelled in the gravelly watercourse, and vied for most exposed position with the annual, *Euphrasia, epacris petrophila* (in acre copses), and *Ranunculus Muellieri* (sheltering under the last-named). The *Pratia*, with its large, single, white flowers and succulent stems, crept along the depressions of the High Plains, also as high as 5900 feet, and *Myriophyllum pedunculatum* gave the water-pans a reddish tint. While examining some *Stackhousia pulvinaris* plants in fruit, with which was associated the rare dwarf grass *Agrostis Muellieri*, we found that a snake, 20 inches in length, had used two good-sized stones for sloughing—it had squeezed between them. Mr. J. A. Kershaw regards this as the White-lipped Snake, *Denisonia coronoides*.

Aciphylla glacialis, found between 5600 feet and 5900 feet, was less common about Fainter than about Feathertop. Bushmen call it "native celery," because of its flowers. It has stiff, sharp-pointed leaves that would not appear to contain much nutriment, so we wondered at its rarity. Our guide offered a possible solution, stating that cattle are fond of it and will almost eat it out. He had noticed a white fluid, of a milky nature, fall from their mouths during mastication. An acre of *Podolepis longipedata*, var. *robusta*, and adjoining an acre of *Helipterum incanum*, var. *alpina-album*, were a wealth of beauty on rocky slopes.

The Bundarra river, a tributary of the Mitta, and 25 miles in length, has its source under Mount Jim, by a scarcely perceptible, shelving, grassy depression on the High Plains. When a mile had been covered, the contracted rock-bed had steep banks and took a sharp turn. Its bed was marked by stones devoid of earth, showing how great at times is the volume of water that rushes along, tearing through all obstacles. Close by were many flowering examples of *Brachycome scapigera*, at 5600 feet—the only plants we saw of this species. At present there was so little water that our guide had never seen the river so dry near its source, and two fishermen showed us a couple of dozen *Galaxias* which they had easily caught, to bait the more voracious imported rainbow trout, in the waters of the West Kiewa. Trout need no tickling in these clear mountain streams. We watched one fine fellow swim up and take the bait, and his subsequent struggles for freedom.

Some 4 miles from the Tawonga Hut, at 5360 feet above

sea level, or half a mile from the sharp turn in the Bundarra above referred to, is "Redbank," where the river has torn its way through enclosing banks, and 40 feet of yellowish brown clay is exposed for 20 feet above the loose stones in the river. Here is a fine fossil formation, 7 feet 6 inches from the grassy surface, lying on cement conglomerates with a primitive coal bed 18 inches thick, on top of 15 inches of laminar clay, containing leaf impressions. Higher up the stream 100 yards is a similar bank, showing examples of petrified wood. Mr. F. Chapman kindly made a cursory examination of the foliated clay we brought back, and we hope that he will find time to give a detailed report on this interesting collection of plant life in bygone times, which he considers of Miocene age, perhaps of Queensland rather than of Victorian Miocene assemblage. In the generic list he has supplied us with he includes two species of *Eucalyptus*, a *Banksia*, *Nothofagus*, the fern *Lastrea Dargoensis*, and refers some of the other impressions to *Nephelites*, *Lomatia*, *Callitris*, with a probable *Bombax*, also *Eucalyptus* and other fruits and reed-like plants. Mr. Chapman finds that the sample of lignite is well preserved and burns with a faint odour of india-rubber, while the specimen of coal shows leaf and stem remains.

We found on the banks of the river along the rocky edges the rare *Muehlenbeckia axillaris*, a relation of the lighums. It is interesting to note that the ferns at present growing in the vicinity of the fossil bed are *Blechnum pennamaryna*, *Polystichum aculeatum*, and *Asplenium flabellifolium*, while about three miles away on the "Nigger Head," at a height of 5800 feet, we found *Dicksonia antarctica*, well-grown but without sori. This is, I think, a record height for this fern, which sheltered in the large hollow made by a watercourse. The species of *Eucalypti* now growing hereabouts are the Snow Gum, *E. coriacea*, var. *alpina*, and, at 5000 feet, *E. Gunnii*; while a few miles north grows *E. Sieberiana*.

We carried no entomological collecting outfit, and, as Mr. Hooke took exception to my crude methods, he is not to be held particeps criminis for the innocent insect lives taken, more especially those of the collection that proved unidentifiable, consisting of additional nocturnal lepidoptera and interlocked ground spiders, the latter caught while being attacked by a wasp. Mr. G. F. Hill, through Mr. J. A. Kershaw, has kindly identified some of the specimens found at 5500 feet as follows:—Scarabæidæ, *Diphucephala elegans*; Chrysomelidæ, *Paropsis* sp.; Locustidæ, *Tinzedea albosignata*; Acridæ, *Monistria grossa*; Gryllidæ, *Acripeza reticulata*;

Stratiomyidæ, an apterous female, *Boreoides* sp., near *subulata*. Tabanidæ, *Tabanus*, near *circumdatus*. In reply to our enquiry as to the pest so fond of riding on our backs, it would seem that *Musca vetustissima* was the culprit. We were interested in noting the number of these flies necessary to provide a meal for the tame, sleek lizards, which, when driven into the creek, found no difficulty in regaining the bank, scarcely touching the water, over which they appeared to glide rather than swim.

One of our experiences, on returning, will not soon be forgotten. For some days we had seen many miles of the great Kiewa Valley burning fiercely between Mounts Hotham and Feathertop. Messrs. Galbraith and Guy, officers of the State Electricity Commission, accompanied by our guide, had gone back to Tawonga by way of Feathertop and Blair's hut, via Dungey's track. They had sensational experiences. Our only other route lay along the Kiewa-Omeo track, by which we had come. Hints had reached us, but we were not prepared for the blackened and smouldering countryside. Fortunately, we had begun preparations at daybreak, and made an early start. On rounding Mount Fainter we noticed the fire on the track-side, and a heavy bank of black smoke immediately ahead. The wind on top had increased to a gale and whistled among the dry Snow Gums, reminding us of the noise through the cordage of a "windjammer."

We kept steadily going till Bogong Jack's hut was reached, when we decided, in council, that George, one of the two young guides, should ride ahead each quarter of a mile and return to report, while Walter, who had charge of the packhorse, would urge "Sam" to his utmost. We also considered that it would not be possible to get down the steep mountain-sides through rocks and scrub, as we were still over 5000 feet up, and it might even be necessary to cut the packs and get through without encumbrance. A few yards inside the track the fire fiend roared fiercely up the slope, literally jumping from one gum tree to another. Dense clouds of smoke rolled over us, and the sun when seen was of copper. For 2 miles we raced, and our packs, thanks to Walter and George, stood the test so that we won by a narrow margin. We did not pause, however, up the steep and stony track, as we were entering, at about 4000 feet, 3 miles of "Silvertop" (or, as the stockmen wrongly call it, "Woollybutt") forest, and now, half a mile down the Valley, was the fire following up. Few scents are sweeter than that of the leaves of *E. Sieberiana*, but a Eucalyptus forest, when the upper portions of the boles are

bending ominously and straining in a gale, with stray branchlets falling, is not at such a time inspiring, especially when the ground is strewn with 20 stately giants close to your tracks—a memory of a former wind. The uppermost thought is apt to be, something might happen!

Coming through the blaze we had time momentarily to notice the panic-stricken birds that contrived to make weak music. Insects, in their efforts to escape the common enemy, scurried over the track, causing us to think of them. What instinct told them of the impending danger? Was it the smell of the burning leaves, or do insects hear the pandemonium caused by a raging bushfire? Do their kind give telepathic warning to other members of their world?

Altogether, at over 5000 feet, we collected 170 species of plants, as well as a number of varieties, and seven weeds. Omitted from the Census, which will now be added are the following:—*Euphrasia antarctica* and *Carex stellulata* (*C. echinata*). Very rare: *Alchemilla vulgaris*. Rare: *Juncus pusillus*, *J. falcatus*, *Heleocharis multicaulis*, *Scirpus crassiusculus*, *Muehlenbeckia axillaris*, *Geranium sessiliflorum*, *Pratia puberula* (*Lobelia Benthamii*). The last two recorded previously only from "The Cobberas." Alpine only: *Stackhousia pulvinaris*, *Aciphylla glacialis*. N.E. and Baw Baws only: *Callistemon Sieberi*, as well as *Scleranthus mniaroides*, *S. biflorus* and *Diander*.

Astelia alpina, *Exocarpus nana*, *Nertera depressa*, *Pentachondra pumila*, all strictly alpine, bore pretty scarlet fruits as well as flowers.

The fact of our being without horses on top, except for one day, was not without advantage to us as collectors. Hands and knees were in evidence, and consequently close examination and careful handling made for better inspection. One cannot make exact determinations from distant observation, either from coach or horseback. Some may do it, but it is bad, as a rule. I am indebted to Messrs. J. W. Audas and P. Morris, of the National Herbarium, of whose assistance the Club's botanical members are always glad to avail themselves. Messrs. L. T. Guy and W. Maddison kindly helped me to place some of the features I have added to the map.

Some, not naturalists, have asked us what we do on our outings and how we employ our time, and think, like the fox in Galsworthy's reverie, "that man is a kind of fox and should kill for the love of killing." I think we have shown that the naturalist's time can be fully occupied on an all-too-short holiday.

G. A. KEARTLAND

The death of Mr. G. A. Kearthland has removed from amongst us one of the early members of our Club, and one of its most loyal and enthusiastic workers during a period extending over 40 years. He has told us how, in his younger days, he spent his time in studying the habits of our native fauna, examining nests, collecting eggs, and capturing mammals, birds and reptiles to make pets of them, and visiting the Museum to find out their proper names.

One day in 1886 he saw a notice of a meeting of the Field Naturalists' Club, and, coming into contact with Mr. C. French, senr., was nominated by him as a member. To use his own words: "I attended the next meeting (early in 1886) with very anxious misgivings, and walked past the gate of this hall twice before mustering courage to enter." Once inside, however, he found himself in congenial surroundings, and received from the older members help and encouragement such as in later years he passed on to junior members.

"I started home," Mr. Kearthland says, "from my first meeting with a fixed determination to study all branches of natural history. However, after attending a few meetings and excursions I learned how vast was the contract I had undertaken, and decided to confine my attention to one branch, Ornithology, which had always occupied the chief share of my thoughts." He wisely lost no opportunity of taking part in the Club excursions, and thereby learnt much from other workers with whom he soon became intimate—Forbes Leith, A. J. North, C. French, D. Best, W. Kershaw, J. A. Kershaw, A. J. Campbell, F. G. A. Barnard, Dr. W. Macgillivray, J. Gabriel, and others—and at the same time came to rank amongst them as a leading member of the Club, and rendered it most valuable assistance, which was recognised by his election to the committee, and finally to the Presidency in 1907.

His early field work stood Mr. Kearthland in good stead, as was shown in his first paper published in 1890, in which, contrary to the opinion of Gould, he affirmed that there were two species of Teal. He says: "I read a paper on the subject and produced specimens shot in the month of June in support of my contention, which has since been fully recognised as correct."

PLATE II



G. A. KEARTLAND

Mr. F. G. A. Barnard, in describing his first meeting with Mr. Kearthland, relates how, as leader of an excursion, when the weather was unpropitious, he was rather non-plussed by finding that only one member of the Club, then unknown to him, turned up. He was evidently rather lame, and the leader felt somewhat anxious about the capacity of his companion to walk and climb. Before the wet afternoon was over, his doubts on this point were completely set at rest, and he soon found that enthusiasm and strength of will triumphed over any slight physical infirmity, for his companion could walk and climb just as well as his leader.

The first time that the writer came in contact with Mr. Kearthland was on the occasion of the Club excursion to King Island, in 1887. At that time the Island was occupied only by two lighthouse-keepers and a solitary wallaby hunter. There were no roads: the hunters of the sea elephants had left it just as primitive as when Lesueur and Péron, the naturalists on Baudin's expedition, visited it in 1802, except that, unfortunately, its wombats and emus had been ruthlessly exterminated by the hunters. On this expedition, though no new forms of animal or plant life were secured, the members of the party gained valuable experience, and, in a later expedition to the Kent Group in 1890, Mr. Kearthland had special facilities for studying the sea birds of Bass Strait.

From the point of view of natural history, perhaps his most important field work was done as a member of the Horn Expedition to Central Australia in 1894. His main work was the collecting of and taking notes on the birds. It was only rarely that more than one day was spent in the same camp, but he was indefatigable, and, under conditions that would soon have damped the ardour of a less enthusiastic and conscientious worker, he secured a large collection representing typical and varied examples of 78 species, together with most valuable field notes in regard to them, and 20 other species that he knew well.

In the winter months in the Macdonnell Ranges the nights are often bitterly cold, but this made no difference to him, and hour after hour he used to work away by the light of a flickering lamp, with a rug wrapped round him, and the water frozen in a billy-can. The skins were beautifully prepared and descriptions of them, together with the field notes, were published by Mr. A. J. North. Amongst them were four new species, the name of one of which *Ptilotis kearthlandi*, together with that of a plant *Gardenia kearthlandi*, and of a physical feature, Mt. Kearthland, testify to the zeal of the naturalist.

His work on the Horn Expedition led to Kearthland's selection as naturalist on the ill-fated Calvert expedition to investigate the desert region in north-west Australia in 1896. Warburton, Giles, Forrest and the Elder expedition had crossed from east to west, finding no permanent waters or good country. Great lines of rolling sandhills ran from W.N.W. to E.S.E., and the early explorers travelled in the valleys between them. A gap of 300 miles lay between the tracks of Warburton and Giles, and an attempt was now to be made to cut it at right angles. The expedition was under the charge of L. A. Wells, who had with him four white men, his cousin, C. F. Wells, G. L. Jones, geologist, G. A. Kearthland, naturalist, and Trainor, cook. It was an arduous and perilous undertaking, and only three returned.

In the *Naturalist* for 1916 Mr. Kearthland published a few notes, but no full account of the expedition has apparently been written. Leaving Mulawa, inland from Geraldton, in June, the party started off with 20 camels. Early in September they were well into the desert, and crossed altogether some 700 miles of sandhill country. "Sometimes," says Kearthland, "half a mile of flat divides these sandhills, but occasionally they were so close together that the leading camels in the caravan were ascending another before the last of the team had descended the previous one." After long travel, C. F. Wells and Jones left the main party to examine country to the W.S.W., with the intention of cutting the tracks of the latter near Joanna Springs, but they were never seen alive again. L. A. Wells and Kearthland travelled on as arranged to the Fitzroy, but it was a perilous journey. Telegraphing from the Fitzroy on November 10, Wells says that from Mt. Bates to within 52 miles of the Fitzroy, a distance of 500 miles, they passed through a wilderness of continuous, high, steep sand ridges and spinifex. The heat was so intense and the work so arduous that the camels collapsed 170 miles from the Fitzroy. Of the latter distance 50 miles was traversed on foot by moonlight, and 120 by starlight.

"We were obliged," says Wells, "to abandon Kearthland's and Jones' collection, all equipment, provisions and personal effects at 160-170 miles back, only taking absolute necessities to carry us through to the Fitzroy." There was, however, one personal effect which Kearthland—and it was very characteristic of the man—did not abandon. That was a gun lent to him by a friend, and that gun he carried day after day as he trudged across the sandhills; brought it safely back and handed in to his friend without a word of what it had cost him.

It is only right, in connection with these expeditions, to refer to the fact that shortly after his arrival from England at an early age he entered the service of the "Age," and was employed as a compositor for more than 50 years. The proprietors of this journal, recognising his integrity and single-minded devotion to natural history, treated him with great consideration and generosity, granting him leave of absence for his expeditions, and absolving him from hard work in his later years.

Kearland was much more than a mere collector. His great delight was to watch and note the habits of the living birds, many of which he reared. A typical example of this is to be found in the *Naturalist*, March, 1899. It refers to two quails, that he placed in an aviary with cockatoo parrots and a green leek parrot, and shows his keenness of observation. After hiding under grass for a month, they selected, he says, a camping place and began to show themselves. Seven eggs were laid. The green leek showed great dislike to them, so, after a week, it was removed, and the hen bird sat in peace. A glance at her when sitting showed how these birds manage to cover such large clutches. The long feathers on the side of the breast spread out at right angles until the bird would hide an ordinary tea saucer. The male bird took no part in incubation. When the chicks appeared he kept away from his family, perching with the parrots, but, later on, says Kearland, his mind changed, and he was in constant attendance on them.

One of the most interesting of his finds on the Horn Expedition was the rediscovery of the lovely Princess Alexandra parakeet, then known as *Polyteles alexandrae*. It had been found first by Waterhouse, during McDouall Stuart's expedition in 1861, at Howell Springs, far away in the north, and had practically disappeared. To quote Kearland's own notes: "They were only once seen in desert oak forest between Glen Edith and Deering Creek. The advance party had halted for lunch, and, on my arrival, Professor Tate said he had seen a strange looking parrot in the oaks. I started off in the direction indicated and saw what appeared to be a cockatoo parrot flying towards me. Having carefully noted the branch on which it perched, I hurried forward, but, notwithstanding the sparse nature of the foliage, I had to look carefully for some minutes before I found it. . . . Five birds flew into one tree, and I had to walk round three times before I saw them. At last four heads were visible just raised from the thick limbs, the bodies and tails lying horizontally along the timber."

Fired by Kearthland's enthusiasm, every man in camp went out—whites, blacks, Afghans, even the old camp cook forsook his pots and pans and took part in the Polyteles pursuit. I have a suspicion that Kearthland very wisely directed us to spots where it was unlikely that specimens would be found, and went away quietly by himself to where he thought the flock was feeding. I only judge of this from the quaint, curious twinkle in his eye when we returned birdless, and found him busy skinning a number of specimens which, later on, Mr. North said were "all in splendid plumage and condition, and form the finest series of cabinet skins of this species yet secured." It was this series that showed the presence of a spathulate second primary feather in the wing of the male bird, so that a new generic name, *Spathopterus*, had to be invented. Later on, from Messrs. C. E. Cowle and P. M. Byrne, and other friends in central Australia—and he made and enthused friends wherever he went—he received living specimens and eggs and was able to determine their distribution.

It was not only that kind of work in which he was interested. When the question of the reservation of a great national park at Wilson's Promontory came before the Club in 1907, he was chosen as one of its representatives to place the matter before the Government, and, during the same year, he acted as a member of the Club's committee in negotiations regarding the working of the Game and Fisheries Act. He was our greatest authority on questions of the close season for opossums, ducks, quails, etc., and in these matters his first-hand knowledge has been of the greatest value and has indeed had much weight in guiding and determining legislative action.

To all of us interested in the natural history of Australia, Kearthland represents the highest type of a true naturalist, but he was indeed more than this—he was a brave, great-hearted man.—W.B.S.

At the entrance to the St. Kilda Town Hall drive, recently, portion of the asphalt was raised about four inches and cracked in several places. When the layer of asphalt was removed a group of mushrooms, about 12 inches in diameter, was revealed. Undisturbed, they would probably have forced their way completely through the asphalt.—SYBIL HEYMANSON.

Forest Regeneration in Gippsland

By MISS J. GALBRAITH.

The following notes are necessarily incomplete, as visits to the locality described were made at such irregular intervals, and were of such short duration, that it was impossible to keep full records. The area over which the effects of the fire were noticed—several square miles of hilly country east of the Tyers River—has poor soil overlaying silurian limestone, with, for its eastern boundary, a narrow iron-stone ridge; and, for its western limit, a flatter sandstone ridge. The northern side ends in a long gully, running at right angles to these ridges, which ended on the south in another gully, parallel with the first. This second gully reaches the Tyers River, which here bends sharply, just within the western limit of the area.

The hilltop vegetation, before the 1923 fire, consisted of *Eucalyptus Sieberiana*, with small patches of *E. obliqua* and *E. capitellata*, and beneath them a dense growth of shrubs and small plants. *Acacia linearis* seemed to be the commonest shrub, but thickets of *Daviesia latifolia*, *Goodenia ovata*, *Cassinia aculeata* and *C. longifolia* were hardly less numerous. *Helichrysum oblongifolium*, in many places, grew among the *Cassinia*. *Lomatia ilicifolia* and *Olearia myrsinoides* were scattered through the other growths. Braeken was common, and among it grew *Tetralheca ericifolia*, *T. ciliata*, *Dampiera stricta*, *Epacris impressa* and *Pultenaea Gunnii*. In a few places *Platylobium oblongangulum* and *Goodenia geniculata* carpeted the ground, while *Isotoma fluviatilis* filled the roadside hollows. On the ironstone slope *Eucalyptus polyanthemus* grew, and in the valleys *E. goniocalyx* was the only Eucalpt. *E. globulus* grew near the river. On the ironstone both *Daviesia corymbosa* and *Dulicinia* grew, and with them *Goodenia ovata* and *Cassinia longifolia*. Few small plants were found there, and little braeken. The commonest small growths were *Brachycome multifida* and stunted bushes of *Correa rubra*. The gully vegetation needs no description, since it yet remains unburned.

The only orchids noted in the area, before the fire, were *Dipodium punctatum*, common, and *Prasophyllum brevilabre*, in only one place. The fire of March, 1923, left the ground, except in the gullies, bare and black. Only the large Eucalypts remained, black, and bare of green. We did not,

after the fire, visit the locality until December 23 of the same year. Every tree was then covered with a clustering growth of adventitious branchlets. In many places were low thickets of *Acacia linearis*. *Lomatia ilicifolia* was common everywhere, flowering profusely. Bracken was everywhere, and with it short tufts of *Xerotes*, sp.? *Xanthorrhæa minor* on every side uplifted fading spikes of bloom. A few plants of *Helichrysum leucopsidium* were noted. Tufts of *Amperea spartioides* and *Dampiera stricta* dotted the hill-tops. *Olearia myrsinoides* was seen, with a few open flowers, while in many places the earth was blue with blossoms of *Lobelia rhombifolia*, or bright with leaves of seedling Eucalypts, chiefly *E. Sieberiana*. In a few roadside hollows tiny plants of *Acacia verticillata* were seen.

The change in the bird life of these hills was not so great as that in the vegetation. Small birds, Thornbills, Blue-wrens, etc., had been common, but now were rarely seen or heard, while the larger species, Honeyeaters, Robins, etc., seemed only to have retreated to the gullies, where also Eastern Whip-birds and a Lyre Bird were heard. Tree-creepers, *Climacteris leucophaea*, and Gang-gangs, *Callocephalon fimbriatus*, had returned to the Eucalypts on the hill-tops, where the Grey Shrike-thrush, *Colluricincla harmonica*, again made music.

Our next visit, January 22, 1924, revealed a further change in the vegetation of the area. *Dipodium punctatum* was unusually common, and its spikes of bloom were large and deeply coloured. We saw hardly a flower and very few plants of *Lobelia rhombifolia*, but where it had been grew its even lovelier sister, *L. gibbosa*, now in bloom. The plants were very fine; some measured were two feet high. *Thysanotus tuberosus* was common and flowering freely, while through them all *Lomatia* still bloomed. On the sandstone ridge, which we had not visited in December, the flowers were wonderful. Beside species already mentioned, and long prostrate stems of *Goodenia geniculata* and *Dampiera stricta*, there were stretches of the hillside hidden by the lovely white and rose blooms of *Helichrysum leucopsidium*. Many chains of the roadside were blue with great, bushy, flowering plants of *Wahlenbergia gracilis*, mingled with Weeping-grass, *Microlaena stipoides*, and a few tall plants of *Gnaphalium japonicum*. Here the varying forms of Bluebells were very noticeable as they grew in distinct patches, blue and white, large and small, with petals pointed or round. Every bush of *Olearia myrsinoides*—and here there were many—was white with flowers.

Visiting the area, except the sandstone ridge, on September 27, 1924, we found little but thickets of *Acacia linearis*, *Goodenia ovata*, *Daviesia latifolia* and *Eucalyptus Sieberiana*, all from three to six feet high.

On our next visit, October 16, we examined the ironstone ridge. Except in that place little change was noted in the vegetation. Small plants of *Acacia myrtifolia* and *Daviesia ulicina* were seen in an open space. Near the roadside we noticed *Cassinia longifolia* and *Helichrysum oblongifolium*. Growing in the poor soil amid the outcrops of ironstone, *Daviesia latifolia* and *D. corymbosa* were flowering, as was Red Box on the western slope. *Brachyome multifida*, *Astroloma serrulata*, *Tethratheca ericifolia* and *Lomandra filiformis*, all growing strongly, were in full bloom. The broad-leaf form of *Hibbertia linearis* was unclosing its first flowers. *Olearia myrsinoides* promised a wealth of summer bloom, and *Hardenbergia monophylla* was losing its last flowers.

Where the earth was still black and almost bare, ten species of orchids flowered, and large spaces were dotted with leaves of *Corysanthes pruinosa* and *Acianthus exertus*. We must have seen dozens of large patches of *Chiloglottis Gunnii*. All the plants of this species were unusually large, many being four inches high. *Caladenia carnea* and *C. testacea* were very common, while *C. congesta* and *C. angustata* were hardly less numerous. Only two specimens of *C. dilatata* were seen, and one each of *Diuris longifolia* and *Calochilus Robertsonii*. Several small groups of *Thelymitra*, sp.? were seen. *Glossodia* was common here as in all open parts of the burned area.

On our next visit, January 26, 1925, we found *Acacia linearis* and *Daviesia latifolia* growing luxuriantly. On the sandstone ridge was a dense growth of *Eucalyptus Sieberiana*, four to six feet high. *Dipodium punctatum* was again common, but we saw only a few plants of *Helichrysum leucopsidium*, while *Lobelia gibbosa* and *Wahlenbergia gracilis* were even more rare. *Lomatia ilicifolia* was not flowering, and the few visible bushes of *Olearia myrsinoides* carried only one or two small flowers. *Goodenia geniculata* and *Dampiera stricta* were flowering freely. Near the river was a number of small Blue Gums.

A visit in July showed little change in the vegetation. Birds were more numerous. Peaceful Doves were noted as new arrivals.

On September 18 we again examined the ironstone spur. Despite careful search we found no sign of any orchid save *Caladenia carnea*. *Cassinia*, three species of *Daviesia*, *Acacia*

linearis and bracken covered the hill top. Through the whole area *Eucalyptus Sieberiana* was flowering. *Hardenbergia monophylla*, *Bredemeyra volubile*, *Tetratheca ericifolia* and *Pultenaea Gunnii* were flowering amid the *Acacia* and *Daviesia*, also in bloom.

At the time of our next visit, January 28, 1926, all was much the same as a year before, with taller shrubs and still fewer small plants visible. *Cassinia* and *Helichrysum oblongifolium* were much in evidence. Blackened tree-trunks still tufted with adventitious growth, were almost the only signs of the passing of the fire.

On February 23 we found the trees again without green, and the ground black and unbroken by anything but one or two logs, from whose glowing hollows smoke still rose. Some of the young trees, which had grown since the 1923 fire, still stood, dropping their brown leaves slowly to the ground. No birds were seen, but far overhead we heard a Gang-gang crying as it flew.

Visiting the area on April 5 we found the trees, young and old, wreathed with adventitious growth. Beneath them bracken was already a foot high, and the black earth was spotted with tufts of *Xerotes*, sp.?

THE WAYS OF POUCHED-MOUSE.

The Yellow-footed Pouched-mouse was referred to in a tentative way in my letter to the Editor (*Naturalist*, September, 1924), when I invited information. Near Everton I had seen this busy little insect-eater, in a Red Box forest, apparently seeking its food on the rough bark of the stem and branches of the low-spreading trees. Recently I had an opportunity of improving acquaintance in the forests of Grey Box and Yellow Gum near Bealiba. There, in an area undergoing improvement, and in a part of it denuded of trees, I saw the marsupials moving about and in and out of old stumps. Not easily observed at any time, they are seen after an alarm by patiently watching the crevices and knot-holes where presently two tiny points of light indicate the fact that the watcher is watched. From enquiries made among forests workers, I learned that the young of this mouse rarely number more than six. An interesting note was given me by Mr. Coburn, of the forests service. He examined a nest of one of a flock of birds (which, from his description, I take to be the Apostle Birds) and found therein a marsupial mouse comfortably domiciled with her five young ones.—A. D. HARDY.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

PART VI.

Genus CYCLOPHORUS.

CYCLOPHORUS SERPENS (Forst.), C. Chr. Creeping Polypody (Fig. I). V., N.S.W., Q., P., N.Z. This is a strange-looking fern found growing in matted patches on the trunks of ferns in E. Gippsland. The fronds spring from amply-rambling rhizomes, and are generally green above, and of a silvery white or yellowish below, and beset with minute starry hairs which require the use of a microscope to reveal their beauty. Barren fronds are shorter and wider than the fertile ones, and the sori are irregularly crowded among the dense stellate hairs, sometimes running together when old, and causing the upper surface of the frond when narrow to curl backwards until the surface is scarcely visible. It appears that the form that we have in Victoria is the variety *rupestris* (R.Br.) Domin.

Genus PLEUROSORUS.

PLEUROSORUS RUTIFOLIUS (R.Br.), Feè. Blanket Fern (Fig. II). All parts of Australia, E., S. Am., N.Z. This is a common fern growing in all districts of Victoria, and is often seen in association with *Cheilanthes* and the trailing *Asplenium flabellifolium*. The fronds are tufted, 4 to 6 in. long, pinnate. The pinnae are obliquely fan-shaped, about 5 inches long, toothed or lobed, and beset with dense, brown, scaly hairs occasionally glandular, the upper surface less so. The sori are linear, mostly about the middle of the pinna, sometimes almost covering the surface.

Genus ANOGRAMMA.

ANOGRAMMA LEPTOPHYLLA (L.), Link. Delicate Rue Fern (Fig. III). T., V., N.S.W., W.A., and widespread throughout the world. This delicate little plant, reminding one of a Filmy Fern in texture and veining, rarely reaches more than 3 inches in height. In his *Botanic Teachings*, Mueller writes:—"This is the smallest and most delicate of all our Polypodiaceæ, and it is further remarkable among them for its transparent tender-membranous fronds. It is of very sparse occurrence, for which scarcity its merely annual duration so unusual among ferns seems to account." The



H.B.W. del.

I—CYCLOPHORUS. II—PLEUROSORUS. III—ANOGRAMMA.
IV, V, VI, VII—POLYPODIUM.

segments are numerous, oblong or cuneate, about $\frac{1}{4}$ inch long, more or less deeply lobed, with usually a single oblong sorus on each lobe, often covering the whole surface. It has been found on the Yarra River, at Hexham, Skipton (Whan), Mt. William, Lorne, Otway Forest, Lake Burrumbeet (T. S. Hart), and at Heathcote.

Genus POLYPODIUM.

The four species we have in Victoria are found growing in places away from the ground, and seem to need no soil for their growth. Their fronds spring from a rhizome attached by its roots to logs or trunks of ferns or trees, and in the case of the two larger ones the rhizome often creeps up to a great height. The sori have no cover, and resemble those of *Alsophila*, except that they are not raised above the surface of the frond. In the case of the two larger species, the sori are so sunk into the frond (immersed) that they show on the upper surface. The two smaller species belong to a section with veins diverging from the midrib and simply forked or branched. One of these, *P. Billardieri*, has entire fronds, while the other, *P. gramitidis*, has divided fronds with its segments lobed.

The veining of the two larger species is reticulate between the more or less parallel primary veins, with a small, free, usually club-shaped veinlet in many of the areoles (spaces or meshes in the veining).

P. BILLARDIERI (Willd.), C. Chr. Finger Fern (Fig. IV). T., V., N.S.W., Q., Am., N.Z. The fronds are entire, usually 3 or 4 inches long, and $\frac{1}{4}$ inch broad, of leathery texture, which conceals the veins. Sori are oblong or linear, rather long, oblique, and parallel in a single row on each side of the midrib, and, when old, often confluent, covering nearly the whole surface. It has been recorded from all districts of Victoria.

P. GRAMITIDIS, R.Br. Gipsy Fern (Fig. V). T., V., N.S.W., N.Z. Fronds are about 6 inches long, rather thinner in texture than those of *P. Billardieri*, pinnatifid, with segments lobed and sometimes pinnatifid. Sori as in *P. Billardieri*. It is common in the south and east.

P. DIVERSIFOLIUM, Willd. Kangaroo Fern (Fig. VI). T., V., N.S.W., Q., N.Z. This is the large, leathery fern so common on tree trunks in our fern gullies, and which some call the Staghorn or Elkhorn—names that should be restricted to the genus *Platynerium* of Queensland and New South Wales. It bears fronds up to 18 inches long usually pinnatifid with few segments, but sometimes entire and

about 8 inches long. Segments are mostly sharp-pointed, 3 to 6 inches long, and about $\frac{1}{2}$ inch broad, confluent at the base into a broad-winged rachis. The veining is net-like, with free veinlets in the areoles. The sori are orbicular, rather large, distant in a single row on each side of the midrib, and so much immersed in the frond as to show raised "blisters" on the upper side, hence Forster's name "pustulatum." It has been recorded in all districts of Victoria but the north-west.

P. PUSTULATUM, Forster. Scented Polypody (Fig. VII). V., N.S.W., Q., P., N.Z. This fern is much rarer than the last-named, and is distinguished from it by having fronds of a much thinner texture with shorter and narrower segments, fragrant when fresh. According to Dobbie, *New Zealand Ferns*, the Maoris formerly used it for scenting oil. The pustules on the upper surface are less apparent than in *P. diversifolium*, and, having narrower segments, the sori are nearer the edge, and occupy a relatively greater portion of the frond surface.

NEW AND RARE LAND SHELLS.

Many land shells were collected at Byfield, near Rockhampton, Queensland, during the Royal Australasian Ornithologists' Union camp-out in 1924. All the material has not yet been studied, but I understand that it includes two new species and several rare forms. Recently Mr. S. W. Jackson, who has collected land shells in many parts of Australia, and made notable discoveries, kindly sent me two Byfield shells found by Mr. H. G. Barnard, in March, 1926. One species, a large and handsome shell, is new. Mr. Jackson informs me; and the other, *Thersites curtisiana*, var. *pallida*, Hedley, was previously known only by the type specimen, in the Australian Museum, collected by Mr. C. Hedley, near Rockhampton, in 1889. Mr. Barnard's specimens were obtained in the vine scrubs after very heavy rains.

At Byfield, with the ornithologists, I devoted some time to shell-hunting, with considerable success. Immature specimens of *T. curtisiana*, var. *pallida*, were found under a large stone in a damp spot, and, with other species, in a banana plantation. Banana leaves, rotting on the ground, concealed many snails—more than did jungle debris, old logs, etc. Three exquisite *Helicarion* (? sp.) shells were found in a moist cavity in the forked trunk of a tree. Beneath damp bark on boles and fallen boughs, several minute snails were discovered.

Field Naturalists' Club of Victoria

OFFICE-BEARERS, 1925-1926.

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MESSRS. F. CHAPMAN, A.L.S., C. DALEY, B.A., F.L.S., J. A. KERSHAW,
P. R. H. ST. JOHN, and F. E. WILSON, F.E.S.

EXCURSIONS.

MONDAY, JUNE 7 (King's Birthday)—Mount Evelyn. Object:
General. Leader: Mr. G. Coghill. Meet at Flinders st.
Station in time for 8.7 a.m. train. Lunch should be taken.

SATURDAY, JUNE 19.—Herbarium. Object: Botany. Leaders:
Messrs. Audas and Morris. Meet at Herbarium at 3 p.m.

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The Victorian Naturalist :

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 5th July, 1926

Hon. Editor : CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 12th JULY, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBER—	PROPOSER:	SECONDER:
Mr. Albert C. Nilson, 58 Speight St., Newport.	Mr. P. R. H. St. John	Mr. J. W. Audas, F.L.S.
Dr. R. M. Wishart, Riversdale Rd., Glenferrie.	Mr. J. Searle	Mr. J. Wilcox
Mrs. E. Hanks, 739 Sydney Rd., Coburg.	Mr. V. Miller	Mr. H. Dickens
Mr. Don Blair, Middle Park	Mr. V. Miller	Mr. H. Dickens

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Please remember that notes are required for the "Naturalist."

6. Special Sherbrooke Night. (Lantern slides.)

Motion to be submitted asking that the Gully be proclaimed a sanctuary. The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to inform the Secretary of the same, so that he may arrange to have it before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

VOL. XLIII—No. 3.

JULY 5, 1926.

No. 511.

FIELD NATURALISTS' CLUB OF VICTORIA.

The annual meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, June 14, 1926. The President, Mr. Geo. Coghill, occupied the chair, and about 60 members and friends were present.

LATE MR. G. A. KEARTLAND.

The President referred to the death of Mr. G. A. Kearthland, who had been a member of the Club for 40 years, and asked members to stand as a mark of respect.

The President also mentioned that another member, Mr. W. H. Callister, and Mr. J. J. Fletcher, of Sydney, had died since the last meeting. It was resolved that letters of condolence be sent to the relatives.

CORRESPONDENCE.

From Mr. F. Lewis, Chief Inspector of Fisheries and Game, regarding Sperm Whale Head. Mr. Lewis stated that he had had the matter under consideration for some little time, and was only awaiting definite details as to what were likely to be the best boundaries in order that action might be taken to have the area definitely proclaimed a sanctuary.

REPORTS.

Reports on excursions were given as follows: National Museum, Mr. F. Chapman, A.L.S.; Mount Evelyn, Mr. L. L. Hodgson. Mr. F. G. A. Barnard referred to the social evening held at 17 Monomeith Avenue, Canterbury, on May 22, when the President and Mrs. Coghill entertained about 30 members, who spent a very pleasant and interesting evening. Mr. F. Pitcher moved that the thanks of the members who attended the function be tendered to Mr. and Mrs. Coghill. The motion, seconded by Mr. Barnard, was carried unanimously.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Cottrell, 30 Davis Avenue, South Yarra; Miss E. Powles, 49 Rowell Avenue, Camberwell; Miss M. E. Smytheman, 30 Davis Avenue, South Yarra; Miss Edith Raff, Banool Avenue, Kew; Mr. W. H. Nicholls, 132 Geelong Road, West Footscray; were elected as ordinary members, and Mr. D. Orchard, Kinglake, as a country member.

GENERAL.

Mr. A. J. Tadgell read a newspaper report relative to the cutting of grass-trees (*Xanthorrhæa*) in the Grampians. Such operations might involve the destruction of much of the native flora. He moved that the matter be referred to Messrs. C. W. D'Alton and F. D. D'Alton, at Hall's Gap, Grampians, for information. Mr. Keep seconded the motion, which was carried unanimously.

Mr. Pitcher drew attention to the presence of Miss Cottrell and Miss Smytheman, two teachers from England, who had joined the Club. The President welcomed these ladies.

The Hon. Secretary read the 46th Annual Report. Mr. P. F. Morris moved that the report be received and adopted. Seconded by Dr. H. Green and carried.

ANNUAL REPORT.

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentleman—

"In presenting the 46th report, for the year ended April 30, 1926, the Committee desires to thank members for the hearty support received from them during the year, and to congratulate them on the continued success of the Club. During the year 30 new members were elected, consisting of 22 ordinary, 4 country and 4 associate members, while there have been 20 resignations, leaving a membership of 254. The monthly meetings were held regularly, and were well attended, as usual, the average attendance being about 60—members and friends. During the year 11 papers were read, and 2 lectures and 1 address given, all of which, it is hoped, the members found interesting and instructive covering, as they did, a wide range of subjects. They were contributed by the following:—Sir W. Baldwin Spencer; Messrs. L. G. Chandler, F. Chapman, A.L.S., J. Clark, C. Daley, B.A., F.L.S., J. C. Goudie, A. D. Hardy, T. S. Hart, M.A., A. E. Keep, P. C. Morrison, M.Sc., C. Oke, W. J. Parr, A. E. Rodda, and Lance Le Souef.

"The excursions are always popular, and as usual, most of them in the past year were well attended. A number of short half-day trips were made to places around the metropolis, and whole day excursions to the You Yangs, Greendale, Brisbane Ranges, Belgrave, Labertouche, Bunyip, Sherbrooke, Macedon and Mount Evelyn; while more extended excursions were made to Bendigo, Wilson's Promontory, Mornington and the Hopkin's River.

"The Annual Exhibition of Wild Flowers was held in the St. Kilda Town Hall, on Tuesday, September 22, and was

opened by the Hon. F. W. Eggleston, Attorney-General. Although it was a little earlier in the season than usual for our show, a very fine display of flowers, ferns and shrubs was staged by a number of capable and energetic workers, to whom much of the success achieved was due. The result was a profit of £112/6/7, of which amount £55 was given to the Victorian Bush Nursing Association. In returning thanks for the donation, the Association invited the Club to nominate three members as Life Governors. Miss E. H. Gabriel, Mr. Geo. Coghill, and Mr. F. Pitcher have been nominated.

"The 42nd volume of the *Naturalist* has been completed, and we are indebted to Mr. C. Barrett for the capable way in which he has edited our journal. Fortunately, funds have permitted a larger journal and more illustrations than usual, and it is proposed to have at least one full-page illustration in each number as long as funds permit.

"The Hon. Librarian, Dr. C. S. Sutton, reports that the library was made use of by members to a fair extent during the year. Several new publications were received in exchange for the *Naturalist*. The binding of some eighty volumes is in progress, and it is expected that these will soon be available for members.

"Your Committee has given its consideration to several measures for the preservation of our fauna and flora, and more especially to obtaining the permanent reservation of Sperm Whale Head as a National Park for Southern Gippsland.

"The Committee desires to express its thanks to Messrs. Coghill and Haughton for the use of rooms for Committee meetings. Attendance at the twelve Committee meetings held during the year was as follows:—Dr. Sutton, Messrs. Oke and Williamson, 12; Mr. Coghill, 11; Messrs. Barrett and Chapman, 10; Mr. Pescott, 9; Mr. Daley, 7; Messrs. Barnard, Searle, St. John and Wilson, 6; Mr. Kershaw, 5; Mr. Hooke, 2.

"In conclusion, your Committee desires to thank all who have helped forward the work of the Club during the year, and trusts that the same generous support will be given to the new Committee, allowing fresh opportunities for the study of natural history in its many branches.

"On behalf of the Committee,

"(Signed) GEO. COGHILL, Chairman.

"CHAS. OKE, Hon. Sec."

Melbourne, May 26, 1926.

The Hon. Treasurer submitted the 46th Annual Statement of Receipts and Expenditure, and drew attention to the following points of interest:—

FINANCIAL REPORT.

The Financial Statement for the 12 months ended April 30, 1926, reveals the following facts in comparison with figures of the preceding year:—

Subscriptions have increased by £45, from £153 to £198. This increase is clearly a result of the raising of subscription rates, which took effect from May 1, 1925, as the income under this heading averaged £155 for the 3 previous years. It was estimated at the beginning of the period that the new rates would bring in £192, provided that no members were lost on this account. A justification of the action seems to lie in the net increase of members during the year, coupled with the realising of the expected amount of subscription money.

Amongst other regular sources of income, sales of the *Victorian Naturalist*, totalling £30, show an increase of £9 on the last period, this amount including the sale of one complete edition at £18.

An estimate prepared 12 months ago, enabled it to be seen that an expenditure of about £20 per month upon the *Naturalist* should be within our means. This has been carefully adhered to, with the result that the cost of producing and circulating the magazine has amounted to £250. Though this is an advance of £50 on last year, it may be noted that it is equalled by the subscription increase already referred to.

Other expenses of general maintenance, which last year amounted to about £40, show in this year's figures at £56, and this increase of £16 consists chiefly of library binding £10, and an advance in general printing of £4.

Wild Flower Exhibition. Some anxiety was felt respecting the financial success of this function, considering that it was being held at the St. Kilda, instead of the Melbourne Town Hall. Though ticket box sales show a shrinkage of £19 (or 380 fewer tickets purchased than on the last occasion in the city), the sale of plants, flowers and refreshments brought in £15 more. While the cost of the hall was £10 lighter, other expenses increased by £16. A summary of the position is as follows:—

	Last Year	This Year
Gross Takings	£169	£166
Expenses	50	56
Net proceeds ..	£119	£110

of which £55 was handed to the Bush Nursing Association, leaving a profit of the same amount to the Club.

The total liquid funds of the Club have increased during the financial year by £15/8/9, showing still a dependance upon the Show for funds to lay out in other directions.

FIELD NATURALISTS' CLUB OF VICTORIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR TWELVE MONTHS ENDED 30th APRIL, 1926.

Receipts.

To Balance in Bank on 1st May, 1925	£17 14 5		
„ Subscriptions—			
Town Members			
Current year	£138 10 0		
Arrears	24 2 6		
In advance	6 10 0		
Country Members:			
Current year	22 17 6		
Arrears	3 5 0		
In advance	1 17 6		
Associate Members	1 10 6		
		£198 13 0	
„ “Victorian Naturalist”—			
Subscriptions	5 4 0		
Cash Sales	30 5 10		
Reprints Charged	2 2 6		
		37 12 4	
„ Donations to Publishing Fund		3 1 0	
„ Interest from Savings Bank and War Loan Bond		5 9 5	
„ Sale of Club Badges		0 2 9	
„ War Loan Bond withdrawn on maturity		20 0 0	
„ Plant Census Account—			
Sale of Books in year		24 4 10	
„ Wild Flower Exhibition, September, 1925—			
Ticket Sales	28 3 0		
Cash at Doors	63 17 0		
Sale of Plants, Flowers and Refreshments	74 8 9		
		166 8 9	
			454 12 1
			£473 6 6

Expenditure.

By “Victorian Naturalist”—			
Printing	£180 12 6		
Illustrating	28 0 0		
Wrapping, Despatching and Postage	27 8 5		
Reprints—Free	9 0 0		
Reprints—Charged	5 8 6		
		£250 9 5	

By General Printing	15	8	9
„ Library Account—			
Purchases and Binding	16	9	9
„ Rent of Hall and Fee to Caretaker	13	10	0
„ Postage, Advertising, Bank Charges, Insurance, and Sundries	10	12	10
„ Plant Census Account	1	6	0
„ Wild Flower Exhibition, September, 1925—			
Hire of St. Kilda Town Hall	8	8	0
Purchase of Plants and Flowers	18	6	1
Printing and Advertising	13	19	6
Cartage, Freight and Sundries	16	13	0
Donation to Bush Nursing Association	55	0	0
(Balance retained in Funds of Club £54/2/2)			
	112	6	7
„ Transfer to State Savings Bank	25	0	0
„ Balance in Bank and cash in hand on April 30, 1926 ..			
	445	3	4
	28	3	2
	£473	6	6

STATEMENTS OF ASSETS AND LIABILITIES ON 30th APRIL, 1926.

Assets.

Arrears of Subscriptions, £87/7/6, estimated to realise ..		£50	0	0
E.S. & A. Bank Balance	£28	2	11	
Cash in Hand	0	0	3	
				28 3 2
State Savings Bank		175	0	0
Library and Furniture (Insurance Value)		130	0	0
Mounted Badges on hand		1	2	6
Plant Census Account (difference between cost and sales of books)		145	5	10
Accounts owing to Club—				
For Advertisements in "Victorian Naturalist"	£5	0	0	
For Reprints charged	4	14	0	
				9 14 0
				<hr/> £539 5 6 <hr/>

Liabilities.

Subscriptions paid in advance	£9	2	6
Balance of Char-a-banc Fund	5	6	0
Outstanding accounts	34	4	2
	<hr/>		
	£48	12	8

Audited and found correct on June 8, 1926.

C. A. LAMBERT }
H. HUGHES } Hon. Auditors.

A. G. HOOKE,
Hon. Treasurer.

The statement was received and adopted on the motion of Messrs. F. Pitcher and J. A. Kershaw.

ELECTION OF OFFICERS AND COMMITTEE.

The following (unopposed) were declared duly elected:—President: Mr. E. E. Pescott, F.L.S.; Vice-Presidents: Messrs. A. E. Keep and P. R. H. St. John; Hon. Treasurer: Mr. A. G. Hooke; Hon. Librarian: Dr. C. S. Sutton; Hon. Editor: Mr. C. Barrett, C.M.Z.S.; Hon. Assistant Secretary and Librarian: Mr. H. B. Williamson, F.L.S.

A ballot was taken for the office of Secretary, and resulted in the election of Mr. L. L. Hodgson.

The following were elected members of the Committee as a result of a ballot: Messrs. J. W. Audas, F.L.S.; F. Chapman, A.L.S.; C. Daley, B.A., F.L.S.; J. A. Kershaw, and C. Oke.

Mr. Pitcher referred to the valuable services of Mr. Hooke, as Hon. Treasurer, and said that the thanks of the Club were due to him.

Mr. A. E. Keep moved that the thanks of the Club be extended to Mr. Oke for his valued services as Hon. Secretary during the past five years. Seconded by Mr. A. J. Tadgell, and carried unanimously.

PAPER.

At this stage Mr. Coghill vacated the chair, and Mr. Pescott assumed office. Mr. Pescott thanked members for electing him as President for the ensuing year. He also paid a tribute to the work of the retiring President, and moved that the thanks of the Club be tendered to Mr. Coghill, and the officers and committee for their past services. Mr. Keep seconded the motion, which was carried with acclamation.

Mr. Coghill returned thanks on behalf of himself, his fellow officers and the Committee, and specially mentioned Mr. Barnard, who was retiring from office after 42 years of service.

Mr. F. Pitcher moved that a hearty vote of thanks be accorded to Mr. C. Barrett, the Editor, for his good work in connection with "The Victorian Naturalist." Seconded by Mr. Williamson and carried unanimously.

"The Amoebae—Their Structure, etc." by Mr. J. A. Ross. In the absence of the author this paper was read by Mr. Stickland.

EXHIBITS.

By W. H. NICHOLLS: Eight water-colour drawings of Australian orchids. Among these were *Prasophyllum intricatum*, Stuart; *Pterostylis ophioglossa*, *Pt. decurva*, Rogers, and *Pt. truncata*, Fitz. Photographs of the White Bog Orchid, *Burnettia cuneata*, collected at Athlone, October, 1925. Many details, in water-colour, of rare species, including two undescribed species, now in the hands of Dr. R. S. Rogers, *Prasophyllum Hartii*, from Bairnsdale, and *Caladenia alpina*, Alps and Baw Baws, *Prasophyllum fusco-viride*, and others.

By Mrs. E. COLEMAN: *Pterostylis grandiflora*, R.Br., Belgrave, 13/6/26.

By Rev. GEO. COX: Seeds of Mango-tree, found by members of the Mornington Naturalists' Club, washed up on local beaches. Mr. P. R. H. ST. JOHN kindly supplies the following information:—"Seeds of Mango-tree, *Mangifera indica* (Linn.), Family—Anacardiaceae, Habitat—East Indies, Malaya, etc. This tree yields the Mango, a large drupe, variable in colour and size, of a perfumed and sugary-acid taste, becoming purgative when eaten to excess, but which is one of the best tropical fruits. Its bitter aromatic root is used medicinally. We have one small tree in cultivation at Melbourne Botanic Gardens."

Mr. J. Searle: (1) Several stained and mounted specimens of Amoeba, showing extended pseudopoda, nucleus, ingested diatoms, etc. (2) T. S. of pinnule of a "Feather Star" (one of the Crinoids), showing ovary, axial, nerve-cord, radial nerve, ambulacral vessel, etc.

Mr. E. E. Pescott, F.L.S.: Flowering specimens of Coolgardie Gum (*Eucalyptus torquata*), and Bushy Heath-myrtle (*Thryptoccene Mitchelliana*); also aboriginal stone weapon.

Mr. H. B. Williamson, F.L.S.: Specimens of species, illustrated in Victorian Ferns, Part vi. Flowering specimens of the only yellow species of *Brachycome* (*B. chrysoglossa*, F. v. M.)—Golden Daisy—collected by Mr. J. Williams, at Donald.

Mr. C. Oke: Vegetable-caterpillars.

Mr. C. Daley, B.A., F.L.S.: Case moths.

Mr. V. Miller: Aboriginal grinding stone, from Malla-coota.

Mr. J. A. Kershaw: Young Tiger Snake, double-headed.

Greenhood Orchids of Victoria

BY W. H. NICHOLLS.

Part 1.

The *Pterostylis* group of terrestrial orchids is probably the most interesting, if not the most popular, genus of all our Orchidaceæ. The Greenhoods are not beautiful, when compared with some of the other genera or families, notably *Thelymitra* and *Caladenia*; but some of the species are attractive, and dainty, notably *grandiflora*, *revoluta*, *falcata*, *decurva* and *alpina*, each with its own peculiar charm.

These plants are widely known as Greenhoods, but "Hooded" orchids would be far more appropriate, as a fair number of the species are more brown than green, as *vittata*, *pedunculata*, *rufa*, *Mitchellii*, *truncata*, *pusilla*. It must be remembered that the *Thelymitras* once were called Hood-orchids; now they are known as Sun-orchids. Almost all of our Greenhoods have a sensitive labellum, in many of them it is extremely irritable, a mere touch or a light breeze being sufficient to cause disturbance, which is recognised as essential for the fertilization of the species.

The pollinary mechanism is most intricate in many Greenhoods, but too little attention has been paid to the seedlings of any species of this group; they have been found no doubt, and it is probable that plants from seed are far more abundant than is usually supposed; as witness the enormous number of very small plants seen in some seasons. With the very inadequate knowledge we at present possess, it is hard to say whether dissemination or root-multiplication plays the greater part in the propagation of the various species.

The majority of those species usually found in damp places, or in districts where soil situations, albeit not damp, still seem conducive to the plants' well-being, have comparatively small tubers. An examination of those occurring in somewhat dry places reveals their tubers as very large, or, if of small size at some distance beneath the surface. Some investigations recently made on the Keilor basaltic plain support this view. The little tubers of four plants were found to be between 4in. and 6½ inches below the surface. Two species, representing the large-tubered growths of arid country are *Pt. rufa*, B., and *Pt.*

mutica, Br. Their tubers often may be found with the extraordinarily large diameter of $1\frac{1}{4}$ inch in the widest part!

In Victoria we know, at present, 29 valid species. I say at present, as hardly a year goes by, without some new orchid being discovered, a *Pterostylis* or member of another genus, such, if not new to science, will at least be new for the State. *Pt. decurva*, Rogers, and *Pt. truncata*, Fitz, are two recent finds, the former a species new to science, and the latter new for Victoria. The first-named was found during the Summer of 1920, on the Dandenong Ranges; the latter, on the You Yangs Range, as recently as 1924. Altogether, 11 species have been added since 1889. It is probable that *Pt. ophioglossa*, Br., a most beautiful, almost copper-coloured form, will be added to our list ere long. It occurs in the coastal districts of New South Wales, in those situations favoured by its close relation *Pt. concinna*, Br.

Pterostylis unquestionably is an Australian type, but not endemic. See "The Distribution of Australian Orchids," by Dr. R. S. Rogers, *Trans. Roy. Soc., Sth. Aus.*, Vol. xlvii, 1923, where the following interesting table is given:—

Pterostylis R.Br. Australia, 43. New Zealand, 12 (of which eight are endemic, and four common to Australia). New Caledonia, four (of which one is endemic, and three in common with Australia). New Guinea, two (endemic). Total, 54, of which 50 are endemic.

The present totals for the States of the Commonwealth are as follows:—Victoria, 29; New South Wales, 28; Queensland, 16; South Australia (including Northern Territory), 22; Western Australia, 10; Tasmania, 19.

For convenience we will not adhere to the alphabetical order of the Census, but, as far as possible, describe seriatim the members of groups that have many points in common.

Pt. mutica, R.Br. (Fig. 1). (Docked).

The Midget Greenhood is a plant of very variable habit; though quite sturdy and of low growth in Victoria, it reaches to a height of over 12 inches in New South Wales, while Dr. Rogers, in *The Flora of South Australia*—Part 1, page 152 (1922), records it as a small, slender species, about 4 inches in height. It is now many years since I made the acquaintance of this plant. It was on the Stony Creek, just off the Melbourne-Geelong Road, beyond West Footscray, among the rocks, in the company of our most beautiful violet (*Viola betonicifolia*) and the Adder's Tongue Fern (*Ophioglossum*), that it grew in numbers. The plant is wholly green, with many small flowers, usually between 7 and 14; and the basal leaves somewhat faded at time of flowering. It



1—*Pt. matica*, Br. 2—*Pt. cynocephala*, Fitz. 4—*Pt. alpina*, Rogers.
5—*Pt. falcata*, Rogers. 10—*Pt. nutans*, Br. 11—*Pt. curta*, Br.
15—*Pt. barbata*, Lindl.

NOTE.—The labella are marked with figures corresponding to the species.

Plants only two-thirds natural size

is at once recognised by the labellum (which is very sensitive) having the appendage pointing inwards.

All Eastern States, including South Australia and Tasmania. Flowering time, August-November.

Pt. cynocephala, Fitz. (Fig. 2). (Swan-headed).

The Swan Greenhood is a plant very similar to *Pt. mutica*, but, in this State at least, it is much more slender, taller, and of a richer green. Recognised also by the labellum appendage, which, in this case, points outwards. Found, like *Pt. mutica*, in open grassland, or open forest country. Victoria, New South Wales, South Australia, and Tasmania. —September-October.

Pt. parviflora, R.Br. (Fig. 3). (Small flowered).

The Tiny Greenhood. The labellum and column of this species are really beautiful. There are three forms: coastal, inland, and (in Tasmania) alpine. The coastal form is very slender, rarely more than 7 inches in height, and the flowers, which are few, are of pale colour. The inland form often is tall, up to 23 inches; often with many flowers (up to 13 collected by the writer), with dark green striae, other markings being yellowish-brown or red. The alpine form, which is known in Tasmania as variety *Pt. aphylla*, I have received from Tasmania; this blooms in December, and is quite stout, rather fleshy, very short, with few flowers (1-2). The finest specimens I examined came from Everton, in the N.E. of Victoria (June). The plants were tall and the individual flowers were almost $\frac{1}{2}$ -inch in length (7-16th's), minus the ovary. Firmly striped with green and rusty-brown markings. At the base of the stem many rosettes of leaves are clustered. Plant rarely with basal leaves.

All States (Western Australia excluded), Tasmania (lowlands). Flowering March-June; South Australia, March-June and November-December; Tasmania (alpine) December.

Pt. alpina, Rogers. (Fig. 4). (Alpine).

The Alpine Greenhood. A slender, glabrous species, varying in height from 5 inches to 20 inches. It has scattered stem leaves, usually 4 or 5, and the single, large flower is softly coloured in green and white. Usually solitary, but sometimes in scattered or compact groups, more especially in alpine regions (Baw Baws). Strange to say, this plant was once thought to be a variety of *Pt. falcata*, Rogers, when the latter was mis-named *Pt. cucullata*, Br. But there is very little resemblance to that particular species. Two noticeable features of *Pt. alpina* are the soft blending of green and white in the neatly fashioned flower, and the pronounced backward sweep of the lateral sepals. This is not

strictly an alpine plant, it occurs in many parts of the State, usually in damp forest country, and along the banks of streams. It was sent to me recently from Tasmania, by the Ven. Archdeacon Atkinson, of Penguin, who discovered it in dense, almost impenetrable country on the Hellyer River. This is the first record of this species having been found in that State. Its discovery in Victoria, many years ago, was due to the untiring efforts of Mr. C. French, jnr.

Victoria, Tasmania—September-February. (Feb., Baw Baws).

Pt. falcata, Rogers (Fig. 5). (Sickle-shaped galea).

The Sickle Greenhood. This orchid is well-named, and represents our largest type of Greenhood; the largest diameter of several flowers received last November was $3\frac{1}{4}$ inches (including ovary); these came from the Grampians. All the segments are sickle-shaped. The caudae of the lateral sepals in the freshly opened flower often assuming a falcate position; but, as in some other species, the position of these segments changes somewhat, eventually assuming a reflexed position as in *Pt. alpina*, Rogers. Plant usually about 8 inches in height, basal leaves, ovate lanceolate rarely rosulate; stem bracts, 2-4 lanceolate. Flower, green and white, with some brown markings on the segments. Common in many parts of the State, confined to swampy, low-lying ground, and other damp situations.

Victoria, Tasmania—October-January (January, Tas.)

Pt. obtusa, R.Br. (Fig. 6.) (Obtuse labellum).

Blunt-tongue Greenhood. A neat and dainty species, 5 inches to 10 inches in height, normally single-flowered; usually, green with brown markings, variable in minor details, but distinguishable by short, obtuse *labellum not protruding beyond the sinus*. Radical leaves quite unlike those of *Pt. decurva*, Rogers. On rocky hillsides around Fern Tree Gully, Dandenong Ranges. Fairly numerous.

All States (excluding Western Australia).—March, April and May

Specimens of this plant received from New South Wales (Martin's Creek, near Paterson), were almost wholly pale green. The lip much more projecting and the radical leaves on very long slender petioles, as opposed to the short, almost sessile, type of the Victorian form.

Pt. decurva, Rogers. (Fig. 7). (Decurved apex of galea).

The Graceful Greenhood. Our most graceful species, often confused with *Pt. obtusa*, Br., which it much resembles; but in *decurva*, the *labellum protrudes conspicuously beyond the*



3—*Pt. parviflora*, Br. 6—*Pt. obtusa*, Br. (and radical leaves).
 7—*Pt. decurva*, Rogers (and radical leaves). 8—*Pt. concinna*, Br.
 9—*Pt. toveyana*, Ewart. 12—*Pt. pedunculata*, Br. 13—*Pt. pedoglossa*, Fitz. 14—*Pt. truncata*, Fitz. (and Radical leaves).

Plants only two-thirds natural size

sinus; there are much longer extensions of all five segments, and the plant flowers in the summer months. Collected at Fern Tree Gully (1920) by A. N. Burns, and, like *obtus*a, to be found on many hills thereabouts. It also occurs in Tasmania, where it has, until lately, been taken for *Pt. obtusa*, Br.

Victoria, Tasmania—November-January.

Pt. concinna, R.Br. (Fig. 8). (Neat).

The Trim Greenhood is a common gregarious species, from 2 inches to 12 inches in height, confined to the coastal districts, and a few damp gullies inland. (Eltham). It is at present our only existing representative with a bifid labellum (see *Pt. Toveyana*). The large assemblages of this plant, seen during the winter months, under the Tea-tree lining the shores of Port Phillip Bay, and elsewhere, are most interesting to orchidologists. Dr. Rogers records this species as being very rare in South Australia.

All States (excluding Western Australia)—June-August.

Pt. Toveyana, Ewart. (Fig. 9). (After Mr. J. R. Tovey).

The Mentone Greenhood is under 5 inches in height, resembles a small *Pt. concinna*, but has stem leaves (*P. alata* is supposed to be one of its parents). It was first found at Mentone, 1907, by the late Mr. J. R. Tovey. It is easily distinguished from *Pt. concinna*, Br., by its much smaller habit, by the presence of ovate or oblong stem leaves, and the longer labellum, which is very slightly bifid. It has not been found in Victoria now for many years. The original locality has not been protected, and tender plants, growing in open spaces in holiday resorts, are bound to suffer. As recently as 1924, I received specimens from Tasmania of what was supposed to be a form of *Pt. concinna*, Br., but examination showed that they were identical with the Mentone Greenhood. This species is widely distributed throughout the Island State, but is not regarded as common, even there.

Victoria, Tasmania—May-July.

Pt. nutans, R.Br. (Fig. 10). (Nodding).

The Nodding Greenhood. Normally single-flowered, green with rusty markings at the tips of the segments. It is similar to our commonest and best-known species. The plants, which are from 3 inches to 15 inches in height, favour sheltered positions, chiefly under trees, in damp situations. The curious nodding habit of the flower makes it a general favourite, and it stands alone as a typical Greenhood. Specimens gathered at the foot of the Dandenong Ranges

(between Boronia and Bayswater), and near Wattle Glen (1923), were from 12 inches to 15 inches in height, and very sturdy. In some specimens the rosulate leaves at the base were 5 inches in length (including petioles).

Common, all States, excepting South Australia, where it is rather scarce—September-November.

Pt. curta, R.Br. (Fig. 11). (Shortened lateral sepals).

The Blunt Greenhood also is a very common species, from 4 inches to 11 inches in height, with radical rosette at the base of the stem. The chief features of the flower, are the blunt or shortened appearance of the galea and sepals. The large red-brown labellum, which is curiously twisted to one side, and the pale colour of the flower. In New South Wales two forms occur, one similar to our own species, and another much smaller and somewhat uncommon.

All States (excluding Western Australia)—August-November.

Pt. pedunculata, R.Br. (Fig. 12). (Stalked).

The Maroon-hood blooms at the same time as *Pt. nutans*, Br., with which it is often found growing; it has an exceedingly slender stem, and, sometimes, *large*, basal leaves. The single flower is very small, and the prevailing colour usually dark-brown or red, is restricted to the forward half of the flower. The labellum is bluntly ovate in shape. Fairly numerous in many parts of the State.

All States (excluding Western Australia)—September-November.

Pt. pedoglossa, Fitz. (Rudder-shaped labellum). (Fig. 13).

The Tailed Greenhood. A small, fragile, and rather dainty plant 2.5 inches in height, almost wholly green; to be sought in our heathland thickets, where usually it is well hidden. The delicate prolongations of the paired sepals, being erect, give height to the plant and add to the attractive appearance of the slender flower. Quite large colonies are common. Frequenting such secluded places, this species, perhaps, is not nearly so rare as is usually supposed to be. Always an Autumn flowerer.

Victoria, New South Wales and Tasmania—March and April, the best months.

Pt. truncata, Fitz. (Fig. 14). (Cut short).

The Brittle Greenhood, is a remarkable species, easily distinguished from all others by the enormous expansion of the fore-part of the galea, by the slight "curta" twist to the labellum (in the mature flower), and the dwarf habit; remarkable also for such a large flower. It favours sheltered

positions, chiefly among Rock Fern (*Cheilanthes*), and Snowy Mint bush thickets, or among rocks. The succulent form, which is exceedingly dainty, is plentiful during very wet seasons. It was first recorded in Victoria in 1924, from the You Yangs Range, and subsequently from the Brisbane Range, also from Tottenham and Sunshine. The vernacular, "Brittle Greenhood," is an apt one, the galea being unusually fragile. In June last I received several fine specimens of this orchid from the Paterson Valley, N.S.W. (Rev. H. M. R. Rupp.) These differ from the Victorian type only in minor details.

Victoria, New South Wales—April-June.

Pt. barbata, Lindl. (Fig. 15). (Bearded).

The Bearded Greenhood is a grotesque type, usually under 12 inches in height, almost wholly green. It derives its specific name from its long, hairy labellum, which depends directly from the front of the flower; the hairs are yellow, and the tip is adorned with a red knob; which, under the magnifying glass, is a beautiful object. This is a very leafy species, with the leaves, in fact, the whole of the plant, richly veined.

Widely distributed all States (excluding Queensland).—September and October, its best months.

EXCURSION TO MT. EVELYN.

Twelve members and friends journeyed to Mt. Evelyn on Monday, June 7, and were met, on arrival of the train about 10.30 a.m., by Mr. L. Hodgson, who, in the absence of Mr. G. Coghill, acted as leader. The party proceeded towards Wandin, keeping close to the railway line; but, most of the country having been swept by bush fires last summer, little of botanical interest was observed. At Stringy-bark Creek, a halt was made. Some of us rambled in the neighborhood, others watched a friendly Yellow Robin, several Thornbills, and Honeyeaters, which were extracting nectar from the blossoms of Eucalypts.

Some distance down the creek, we reached a strip of unburned country. The main Warburton road was followed in the direction of Lilydale, and a deviation was then made in the bush, which had here escaped the fires. Good specimens of pink and white *Epacris* were gathered. The following orchids were noted during this excursion:—*Caledonia Menziesii* (leaves and buds), *Caledonias* (leaves and buds), *Glossodias* (leaves and buds). The only orchid in flower observed was *Pterostylis parviflora* (Greenhood).—
L. L. HODGSON.

Extinct Vertebrates from Beaumaris

BY F. A. CUDMORE.

Along the Brighton to Beaumaris coast on any warm summer day, you will see hundreds of people bathing in the shallow water. They have no fear of sharks, which are seldom seen there, and have hardly ever been known to attack swimmers. Yet once, not so long ago, as geological time goes, sharks of many different species and sizes abounded in this area; proof that this was so can be obtained at the base of the cliffs at Beaumaris, where a nodule bed of Kalinnan (Lower Pliocene) age contains large numbers of their teeth, also occasional vertebræ, besides the teeth and bones of other fishes, whales and dolphins.

The best exposure of the nodule bed is just west of the boatsheds, but it is covered by water, except at low tide. Collectors should note that southerly and westerly winds prevent the tidal waters flowing out freely from the Bay, and it is useless to visit Beaumaris when these winds are strong. The area exposed at low tide should be searched carefully and systematically. Most of the teeth will be found loose among the shingle, having been worn out of the soft rock by the scour of the tides—therefore, turn over all pebbles—others still embedded can be easily extracted by means of a hammer and chisel.

The body of a shark is composed mainly of gristle, or cartilage, the only parts hard enough to be preserved as fossils being the teeth and vertebræ; the latter also are found at Beaumaris. The dentine, or enamel, of these teeth is well preserved, retaining a high glaze—I am often asked whether I have polished my specimens—while the bases, or roots, though more or less impregnated by mineral matter, still show the original bony structure. The enamel varies in colour from brown to grey green, and occasionally to blue, while the bases are light brown and dark brown. These fossils often show evidence of having undergone a considerable amount of rolling on the old sea floor, while some may have been derived from an older bed before being buried in the nodule band: sometimes the base is missing, the tooth has been split or the enamel has been flaked off. To-day after the lapse of ages the sea is continuing this process.

SHARKS.

Teeth of the still existing Great White Shark (*Carcharodon carcharias* Linné), and of two extinct species of the same genus (*C. megalodon*, Charlesworth, and *C. auriculatus*, Blainville sp.) have been obtained from this locality. This ocean-dwelling "man-eater" reaches a large size, in the tropics, being frequently as much as 30 feet in length; it is seen at times in Port Phillip, but luckily dislikes shallow water. Its teeth are triangular in shape, with both sides serrated; in the case of the largest pair of jaws in the British Museum they are 2 inches long, but those of *C. megalodon* sometimes measure 6 inches in length. Ray Lankester has shown that the latter species probably attained a length of 100 feet. Picture this giant attacking one of the whales, its jaws gaping at least 6 feet apart and revealing those rows of reserve teeth, so characteristic of the shark tribe! Specimens of the living species, and of the fossil teeth, may be seen in the National Museum.

The Blue Pointer sharks are represented by two genera, *Isurus* and *Lamna*. No fewer than five species of the former are present, the teeth being spear-shaped, with sharp cutting edges. I have specimens of *I. retroflexus*, Ag. sp., and the common *I. hastalis*, Ag. sp., that are 3 inches in length. The former is easily distinguished by its double-pronged base and more slender, bent tooth. The three species of *Lamna* are all smaller and rare. Abundant, also, in those old seas, were the Bull-dog sharks (*Odontaspis*), four species having been found. These sharks, like their descendants in Victorian waters to-day, were armed with very pointed, long, slender teeth, which are prized by collectors. Often they show small denticles on the base, on either side of the main point. The living representatives of this family (*Lamnidae*) provide great sport for the big-game-fish anglers of New Zealand.

The Grey and the Blue Nurse sharks add three more species to our list. *Carcharias collata*, Eastman, was described from fossils found in Maryland, U.S.A., Beaumaris apparently providing its first occurrence elsewhere. *C. victoriae*, Chapman and Cudmore, was discovered at Beaumaris, and has been collected also at Table Cape, Tasmania; while *C. aculeatus*, Davis sp., a New Zealand form, since found at other Australian localities, was alive in the still more ancient Balcombian and Janjukian seas. All these are small and easily overlooked.

Three species of Tiger shark (*Galeocerdo*) are present. These teeth have a broad base, with a point which is curved over to one side at an angle of 45 degrees. The natives of the

Gilbert Islands, in the Pacific, bore a hole in the base and barb their spears by lashing on teeth; examples of these weapons can be seen in the National Gallery. The Grey shark (*Notidanus*) is known from Australian rocks by only one specimen; this Beaumaris find has comb-like teeth, mounted on a large bony base.

Curious oval, bean-shaped teeth are plentiful; they are the crushing teeth of the Port Jackson or gunmy shark (*Cestracion*). Ranging in size up to an inch in length, they were set closely together in the mouth to form a palatal surface for crushing shellfish and similar food. There are four species in this bed, also an allied genus (*Strophodus*). A large form (*C. Cainozoicus*, Ch. and Pr.) is common, but the others are either small or rare, two of them being previously unknown outside New Zealand. The occurrence of these sharks in the Tertiary rocks of Australasia is of interest, since in Europe they existed into the first epoch of the Tertiary, when the genus migrated to the south, surviving to-day only off the Australian coast.

The teeth of the Saw sharks (*Pristiophorus*) had been found previously in New Zealand, but it was not known to what sort of fish they belonged; their discovery at Beaumaris enabled Mr. Chapman, who has described a number of the forms here mentioned, to define their relationship, by comparing them with those of the living Victorian species. They came from the rostrum, or saw, which projects from the head of these fishes; one oral tooth has also been found, and it is interesting to note that New Zealand is the only other country whence one has been reported. This species completes the record of 28 sharks known from these rocks; it should be noted that fully half of them have a widespread distribution in other countries, others being found in New Zealand.

Other Fishes.

Here, too, are the rostral teeth of the Saw-fishes (*Pristis*), their first occurrence in Australasia. *P. cudmorei*, Chapman, so far only known from Beaumaris, proved to be more closely related to the recent Mediterranean species than to the form now living in Victorian waters. A more curved form of rostral tooth (*P. recurvidens*, Ch. and Cu.) was discovered here, and has since been collected from the Janjukian of South Australia and Tasmania; the oral teeth are unknown. All these teeth are less than an inch in length.

Next we have a remarkable type in the crushing palatal teeth of two species of Eagle Rays (*Myliobatis*), one being recorded only from Beaumaris. In form they resemble flat, narrow bars, bearing underneath deep, closely set, trans-

verse grooves, giving them a very comb-like appearance. The living ray bears a sharp-pointed, serrated spine in its whip-like tail, and in the tropics the poisonous wound it is capable of inflicting has sometimes caused the death of human beings; fragments of a similar spine are uncovered at times at this locality.

Another striking occurrence is provided by the tusk-like teeth of two species of the Elephant Fish (*Edaphodon*). This genus had long been extinct elsewhere, but survived locally until the Kalimnan period. Only one specimen of *E. mirabilis*, Ch. and Cu., probably the largest species known, has been found, and neither species has been collected yet outside the Beaumaris-Black Rock area.

A palate occasionally found is conspicuous by reason of its flat, mosaic-like surface, due to many small teeth crowded side by side, the general shape being roughly triangular; it belongs to one of the Wrasses (*Nummopalatus*). The palatal jaws of the Porcupine Fish (*Diodon*), so often seen caught in fishermen's nets, are quite common; being formed of layers of plates, the shingle soon reduces them to fragments. Two species of this spiny fish are living in the Bay.

Whales, Etc.

The cliff near the point has produced a whale's rib 6 feet in length. This specimen, to be seen in the National Museum, indicates a whale about 40 feet in length. The teeth of two genera of whales (*Physetodon* and *Scaldicetus*) have been discovered in the nodule bed, which is rich in cetacean bones; rib-fragments, vertebrae and ear-bones (*Cetotolites*) all occur. The dolphins are represented by the teeth and ear-bones of *Steno cudmorei*, Chap., this being apparently the first record of this genus as a fossil, though the living species is found in the Atlantic, Indian and Pacific oceans.

Kangaroos.

Two specimens of the teeth of extinct marsupials have been collected from the shingle; probably they had been derived from the younger non-marine beds higher up the cliffs. One was a tooth of the gigantic kangaroid marsupial, *Palorchestes*, and the other was a jaw containing two molars which has been referred to the giant kangaroo, *Sthenurus*.

I had the pleasure of finding 14 of these species here, for the first time, six of them being new to science and five of the remainder being previously unrecorded in Australia. I hope to find others, since it is certain that we do not yet know all the varied vertebrate fauna of those old seas, and that many prizes remain to reward fossil collectors who carefully search the strata at Beaumaris.

LIST OF VERTEBRATES KNOWN FROM BEAUMARIS.

MAMMALS.

MARSUPIALS—

Palorchestes.
Sthenurus (?).

CETACEANS.

WHALES—

Physetodon baileyi, McCoy.
Scaldicetus macgeei, Chapman.

DOLPHIN—

Steno cudmorei, Chapman.

SHARKS.

Notidanus jenningsi, Chapman and Pritchard.
Cestracion cainozoicus, Chapman and Pritchard.
C. coleridgensis, Chap.
C. novo-zelandicus, Chap.
C. longidens, Chapman and Cudmore.
Strophodus eocenicus, Tate.
*Galeocерdo davis*i, Ch. and Pr.
G. latidens, Agassiz.
G. aduncus, Ag.
Carcharias collata, Eastman.
C. victoriae, Ch. and Cu.
C. (Prionodon) aculeatus, Davis sp.
Odontaspis contortidens, Ag.
O. incurva, Davis sp.
O. attenuata, Davis sp.
O. cuspidata, Ag. sp.
Lamna apiculata, Ag.
L. compressa, Ag.
L. crassidens, Ag.
Isurus hastalis, Ag. sp.
I. retroflexus, Ag. sp.
I. eocaenus, A. S. Woodward sp.
I. minutus, Ag. sp.
I. desorii, Ag. sp.
Carcharodon megalodon, Charlesworth.
C. auriculatus, Blainville sp.
C. carcharias, Linne sp.
Pristiophorus lanceolatus, Davis sp.

SAW-FISH, RAYS, &c.

Pristis cudmorei, Chap.
P. recurvidens, Ch. and Cu.
Myliobatis moorabbinensis, Ch. and Pr.
M. affinis, Ch. and Cu.
Edaphodon sweeti, Ch. and Pr.
E. mirabilis, Ch. and Cu.
Nummopalatus depressus, Ch. and Pr. sp.
Diodon formosus, Ch. and Pr.

Lyre-birds at Sherbrooke

By A. G. HOOKE.

On account of the reservation, some years ago, of a few square miles of country in the Dandenong Ranges, Sherbrooke remains an area of natural forest, and let us hope that it will long be the haunt of the Lyre-bird (*Menura novae-hollandiae*). The rich volcanic soil of the locality, combined with the moist hill-climate, induces the growth of dense thickets of scrub among the timber. These provide shelter from both weather and the encroachment of humanity; while food exists in plenty in the chocolate loam, with its covering layer of decayed leaves, and in the mouldering moss-grown logs, all abounding in the insect life, small crustaceans, etc., on which lyre-birds feed.

Among the factors controlling the distribution of *Menura* rainfall is, I think, not the least. The larger view of this is seen in the restriction of the species almost entirely to the highland belt that runs parallel to the east and south-eastern coast of Australia, a belt distinguished from adjoining lowland country alike by altitude and rainfall; and consequently upon the latter by denser and richer vegetation, providing the environment in which the lyre-bird thrives. The controlling influence of rainfall, in a narrower sense, is apparent within the occupied region by a temporary effect; for, during a dry period in the summer, it has been observed that the usual feeding-ground is generally deserted, apparently being too dry for successful foraging, and larger numbers of lyre-birds than usual, are to be seen close to the streams, scratching up the moist earth by the water's edge, and even moss from stones of the creek. Also, fear seems to take second place to hunger.

In the Dandenongs, where the annual rainfall approaches 60 inches and is well distributed, these trying conditions do not apply often, or for long; and it is usual for the soil to remain in a sufficiently moist state for a livelihood to be obtained by the birds in any portion of the reserve. After rain, or during a light shower, the keenness of *Menura* in the quest of food indicates, it is thought, the stimulating into activity of the prey, the moist conditions encouraging it to come towards the surface of the ground, an action frequently

leading to destruction, and one seemingly expected by the devourer.

It is clear that the lyre-birds in this forest live in colonies, which change their locality from time to time, probably at intervals of some years. At the present time there is one such group containing 11 at least, another of seven, and about four other groups in more inaccessible places. Probably an instinct of protection leads to communal life; the number of birds associating, and the locality frequented being determined by the quantity of food readily obtainable.

A dozen years ago it was a matter of some difficulty, except to an experienced observer, to catch more than a fleeting glimpse of the birds; but, as the Sherbrooke forest has become more frequented by people, so these protected birds, finding themselves unmolested, are much less shy of being quietly observed. On one occasion recently a bird that had been watched at close range by two gentle observers, and was slowly departing, actually returned on being spoken to in tones of soft persuasion, and remained scratching about the same spot, for some minutes longer. Instances of intelligence in other directions are not wanting.

A lyre-bird, which one day we were watching, tried to overturn a small piece of a log, which, having a convex under-surface, "gave" when he touched it. Not succeeding, he left it, only to return in a couple of minutes to make another attempt. This time, after a brief deliberation, standing well back, he seized the further edge of the log with the claws of the right foot and pulled with a will. Two or three times it slipped from his grasp when nearly overturned, but at the final effort, with a better placed grip, success was achieved. However, nothing of interest was revealed.

Perhaps the best known characteristic of this interesting species is the power of imitating the notes of other birds. A good deal of doubt exists respecting the natural notes, in view of the galaxy of melody for which *Menura* is responsible. In my opinion, there are two notes that may be regarded as the lyre-bird's own, in addition to the quieter notes of "sociable" chatter—the familiar and most frequent "blink, blink" that can carry a mile or two in the still, clear mountain air, and the cry of warning, a shrill, almost whistling, sound, generally repeated a second time in a lower tone, after a brief interval.

Many a stalk of ours, creeping noiselessly through the undergrowth, has been abruptly terminated on the observer being observed by this danger signal, repeated farther off, in the silence and instant retreat that have followed dis-

covery. Recently, however, a doubt arose in my mind as to this sound being one of fear, as it has been uttered in the midst of uninterrupted mimicry. But this doubt was practically settled one afternoon lately, when a small, dead sapling unexpectedly fell almost on top of a bird to which I was listening. As it came down with that "swish" that a falling tree makes in still air, I heard the rush of the startled bird, uttering, as it fled, that same peculiar shrill note, repeated, in a tone of unmistakable terror.

Lyre-birds seem to be of a peaceful nature, as we have never observed them fighting among themselves, or attacking other birds. On the contrary, some of the smaller birds will feed with them in order to take advantage of their vigorous upturning of the soil, sharing the result of their efforts. We have noticed the Yellow Robin, and sometimes a party of Scrub Wrens thus associating, unmolested by their benefactor; and I understand this is a habit of the Pilot Bird also.

Just now (June) every day finds the birds busy on their dancing mounds, of which each colony has at least one, probably several in the larger tribes. All the mounds seen have been similar—a very low mound formed of the soil excavated from the surrounding circular trench, from 3 to 4 feet in diameter, closely screened by bracken, or low undergrowth, which frequently renders observation or photography difficult.

Several times, while walking in the late afternoon through a part of Sherbrooke forest that is frequented by lyre-birds, they have been observed going to roost. The younger ones seem to find it necessary to ascend to their chosen spot with the aid of a natural staircase—a dead sapling that, in falling, had been caught half way to earth in the branches of another tree—but the fully grown birds rise by a straight flight of perhaps 30 yards, to the lowest bough of a convenient tree. The timber thereabouts consists mostly of a close growth of Mountain Ash saplings and wattles, 70 feet to 100 feet in height, with practically no branches for 25 feet from the ground. From this first perch the birds ascend by a spiral route, making short flights on a steep ascent from bough to bough, generally keeping a yard or two from the trunk; sometimes flying across into another tree that seems to offer some advantage; and, finally, settling to rest well up towards the tree-tops, 60 feet or 70 feet above the ground. During the climb they will frequently pause to preen feathers and shake their plumage, while sometimes one will stay to give voice to his ideas of mimicry.

This particular haunt of the lyre-bird is being gradually encroached upon by wire-grass, *Tetrarrhena juncea*, which, in the course of a few seasons, has spread over a considerable area of the forest adjacent; covering ground, mouldering logs, and scrub alike with a close matting of tough strands, effectually preventing our lyre-bird friends from finding a living. So effective has the spread of the wire-grass been, in part of the forest, that there is a tendency for it to isolate one of the lyre-bird colonies now living near the edge of the timber. It is unfortunate (to say the least of it), that the territory of this colony is being rapidly encroached upon by tourists, who, for some months, have been allowed to drive their cars about 200 yards inside the forest boundary, and park them on the actual ground over which the lyre-birds of this section have for some years hunted regularly for their food.

The sight and the sound of a motor-car is far more terrifying to lyre-birds than the approach of a human being. Besides frightening them away to thickets which conceal, but do not offer the food resources of the home glade, one consequence is that they do not roost that night in the usual trees. While it is fortunate that cars seldom visit this spot excepting at week-ends, also is it fortunate that, with *Menura*, the memory of these wrongs is short-lived; and his return, with the daylight, to the spot where on so many yesterdays, breakfast has been forthcoming, offers the hope that it is not yet too late, with suitable action, to preserve to our rare feathered friend his ancient domain.

CONVOLVULUS HAWK-MOTHS.

In the *Naturalist* last year, Vol. XLII, page 21, I gave a brief account of the pupation of the Convolvulus Hawk-moth, *Protoparce convolvuli*. The caterpillars of these moths pupated on April 8 and 13, 1925, respectively. On Jan. 5 last, a male moth, and on the 21st a female, emerged. An interesting feature is that owing to the almost complete splitting of the pupa cases, these moths can easily escape from the free, unattached chrysalis, whereas in many other species of lepidoptera, unless the chrysalis is securely fastened to some object, the imago emerges a cripple. The time spent in the pupal condition was 273 days and 283 days respectively.—H. W. DAVEY, F.E.S.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

PART VII.

GENUS POLYPODIUM.

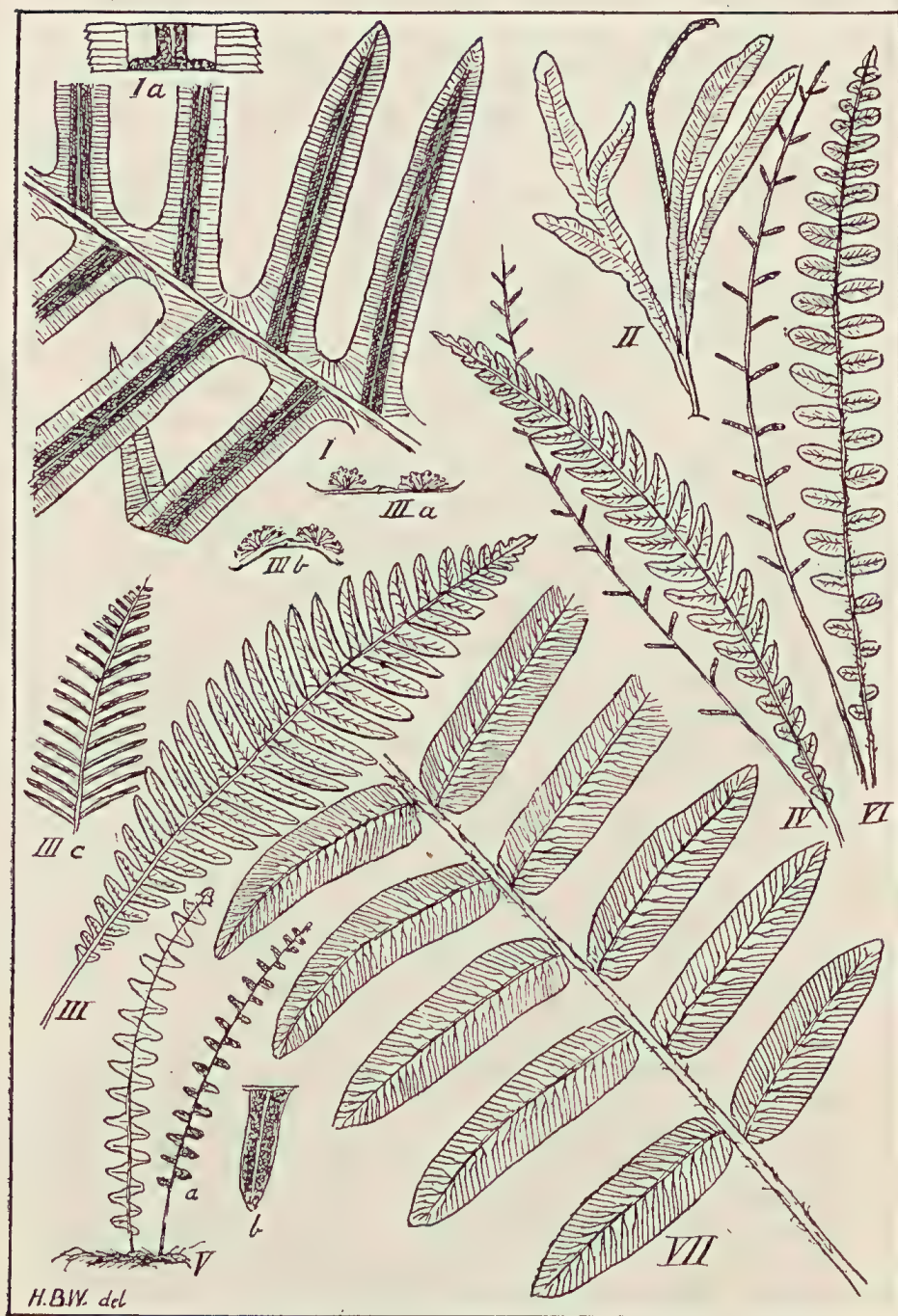
NOTE.—In the Census of Victorian Plants, p.3., the vernacular names and the locality symbols of *Polypodium pustulatum*, Forst, and *P. diversifolium*, Willd (*scandens*), should be transposed. The rare fern is *P. pustulatum*.

GENUS BLECHNUM.

In Bentham's Fl. Aust., and Mueller's "Key," the genera *Blechnum* and *Lomaria* were kept apart, but they are now included under *Blechnum*. The generic difference is shown below (a), where the first-named species is a true *Blechnum*, and the others belong to the section *Lomaria*.

Key to the Species.

- (a) Most of the fronds fertile and all quite similar; involucre never formed by the expansion of the margin. Fig. Ia *B. cartilagineum*
- (a) Some of the fronds narrow and fertile, others broader and sterile; involucre formed by the revolute margin of the frond itself. Fig. IIIa-b. (Sect. *Lomaria*.)
 - (b) Fronds simple, or with a few long segments decurrent on the stalk *B. Patersonii*
 - (b) Barren fronds with numerous segments attached to the rachis by a broad base.
 - (c) Rachis and stalk glabrous, except at the very base.
 - (d) Barren segments narrow, 1 to 4 inches long; fertile ones nearly as long. Rachis dark *B. discolor*
 - (d) Barren segments broadly lanceolate, 1 to 1½ inches long; fertile ones ½ to 1 inch long. Rachis pale *B. lanceolatum*
 - (d) Barren segments ovate-oblong, rarely ½ inch long; fertile ones ¼ to ¾ inch long *B. penna-marina*
 - (c) Rachis or stalk scaly or hispid . . *B. fluviatilis*
 - (b) Barren fronds with several or numerous pinnæ attached by the midrib only; the lowest rarely small *B. capense*



I-VII BLECHNUM

BLECHNUM CARTILAGINEUM, Sw. Gristle Fern (Fig. I). V., N.S.W., Q., This has fronds 1 to 2 feet long, with numerous segments 3 to 6 inches long, almost leathery, with fine teeth on the edge; distinctly veined; dilated and adnate at the base; the upper smaller ones confluent; the lower ones somewhat distant. The sori are in a continuous line on each side of the midrib, with a membranous indusium opening from under the midrib, the two sori at length often concealing the midrib. It is common in the gullies of the ranges near Melbourne.

B. PATERSONII (R.Br.), Mett. Strap Fern (Fig. II). T., V., N.S.W., Q., As., P., N.Z. The fronds are from about 8 inches to nearly 2 feet long, and from $\frac{1}{2}$ to 1 inch broad, generally linear and undivided, but specimens occur with barren fronds pinnatifid, the few segments being 3 to 6 inches long. Fertile fronds are only about $\frac{1}{4}$ inch broad, the sori at length covering the whole under-surface. Occasionally the lower portion of the frond is barren, and the upper part narrow and fertile. It, like its co-genera, is often found growing in the water of the forest gullies.

B. DISCOLOR (Forst.) Keys. Fishbone Fern (Fig. III). N.Z. and all parts of Australia. Of the genus this is the most widely spread in Victoria, and often persists long after it is deprived of its natural shelter. It is rather a tender fern, with fronds 1 to 2 feet long, much paler beneath, with segments attached to the rachis by a broad base, the lower ones being gradually shortened. The rachis and stalk are glabrous and shining black, with scales only at the base of the stalk. The pinnules of the fertile fronds (Fig. IIIc) are very numerous, 1 to 4 inches long, and about $\frac{1}{4}$ inch broad.

B. LANCEOLATUM (R.Br.), Sturm. Lance Fern (Fig. IV). T., V., N.S.W., S.A., P., N.Z. The rhizome is thick and sometimes rises into a trunk 6 inches or more. The fronds are 6 inches to 1 foot long, and 2 or 3 inches broad, lanceolate, pointed and curved upwards, with segments dilated at the base, contiguous and often confluent, $\frac{3}{4}$ inch to nearly 2 inches long, and about 1 inch broad, the lower gradually shortening. The rachis is glabrous, usually pale or green. Segments of the fertile fronds are under 1 inch long, very narrow. Recorded from all districts of the State.

B. PENNA-MARINA (Poir.), Kuhn. Alpine Fern (Fig. V). T., V., N.S.W., Am., N.Z. Fronds 3 to 6 inches long, about $\frac{1}{2}$ inch broad, rising from a scaly rhizome; the stalks slender and glabrous. Segments oblong, rounded, attached by their

broad base; not curved upwards. Fertile fronds (a) often much longer; the segments $\frac{1}{4}$ to $\frac{3}{8}$ inch long (b). This fern is frequent in alpine and sub-alpine springs, and resembles small specimens of *B. fluviatilis*, but the absence of scaly hairs on the rachis distinguishes it from that common species.

B. FLUVIATILIS (R.Br.) Lowe. Ray Water Fern (Fig. VI). T., V., N.S.W., N.Z. This is distinguished by its narrow fronds, 6 inches to 1 foot long, with rounded segments, and by the scaly hairs on the rachis. The segments of the barren fronds are oblong, much rounded at the end; the lower ones nearly as broad as long. Fertile fronds much resemble those of *B. lanceolatum*. It has not been recorded from the S.W. or N.W. of the State.

B. CAPENSE (L.) Schlecht. Soft Water Fern (Fig. VII). All parts of Australia except W.A.; all continents except Europe. This is distinguished from the foregoing 6 species by having the pinnae joined to the rachis by their midribs only. The fronds are very variable, from 3 to 4 feet long, with numerous rigid pinnae of $\frac{1}{2}$ to 1 inch long and 1 inch broad, with large, scaly hairs on the rachis, to a whole frond of 6 inches in length with membranous pinnae of $\frac{1}{2}$ to 1 inch long, with the rachis glabrous or slightly scaly. These varying forms agree in having the lowest pairs not much reduced, or very rarely one small pair lower down. The fertile fronds are equally variable, the narrow-linear pinnae in some specimens under 1 inch; in others, above 6 inches. The large specimens sometimes develop short trunks, and in New Zealand, according to Dobbie, this fern is even more ubiquitous than the Bracken, and the fronds vary from a few inches in dry, exposed places, to ten feet or more in deep wooded ravines. He says:—"Should these (the sides of the gullies) be clothed with *L. Capensis* (*B. capense*), I know of no tougher battle than to struggle through the tangled fronds. They are too close to creep beneath, while to trample under foot the palm-like leaves that rise above one's head is a herculean task." Young fronds, like young gum leaves, sometimes appear of a reddish hue, and remind one of autumn tints on deciduous trees, so that fine patches of this fern, with varying colours from salmon pink and red to bright-green and brown-green, present a beautiful appearance, and one unique in our fern glades. "Soft Water Fern" is not an appropriate vernacular. It would be better to adopt the New Zealand Name "Kio Kio."

VISIT TO PALAEONTOLOGICAL GALLERIES OF THE MUSEUM

There were 22 members and visitors present at the Museum on May 15. By way of introduction, the leader gave a short account of the principal groups of fossil organisms found in the various stages of European sediments, and compared their occurrence with those in Australia. In illustration of his remarks, use was made of the two wall diagrams, showing the stratigraphical succession of the general geological series and of the Victorian strata. The large geologically coloured map of Victoria was then examined, in relation to the distribution of fossil deposits, and the method of using this map in conjunction with the Fossil Key map of Victoria constructed by the leader some years ago for the guidance of provincial visitors, was demonstrated.

This present visit was principally confined to an examination of the fossils contained in the Wall cases of the Galleries. Some of the more remarkable specimens in these were commented upon, such as the slabs of the well-preserved *Glossopteris* leaves, and the remains of their creeping root-stocks, *Vertebraria*; the fossil *Eucalyptus* leaves, from the pleistocene volcanic tuffs of Warrnambool, which are closely related to living species; and the branching stem of the tree-like club-moss, *Lepidodendron*, from Mansfield.

Among the Australian invertebrate fossils were noticed the gigantic rhabdosomes of the hydroid forms called graptolites, as *Goniograptus*, *Dictyonema* and *Triaenograptus*, some of which in the living state probably measured more than a foot across; numerous ancient reef-forming corals, as *Tryplasma*, and *Heliolites*, related to the living Blue Coral, and the Honeycomb coral, *Favosites*; seamats, as *Retepora* and the more ancient *Stenopora* from Maria Island; and a perfect and almost unique fossil eidaroid from the Murray Cliffs. Mollusca were well represented by Giant Oysters from our Tertiary Miocene beds, by megalomorphie Volutes, and the largest known Cowry. The ancient straight-shelled nautili from Loyola were noticed, along with the coiled modern pearly form occasionally met with in our Tertiary deposits, at Muddy Creek and Balcombe Bay. The Queensland Cretaceous Ammonites are here also well represented, thanks to the valuable work of the late Mr. Geo. Sweet, whose collection of these and many other interesting fossils are now included in the museum.

Among the vertebrate fossils, the remains of fishes were pointed out, and attention was particularly given to the remarkable assemblage of sharks' teeth in a slab of limestone

from Batesford. The classical finds of *Diprotodon* remain in the Colac, Melbourne and Macedon districts, shown in the cases, are further illustrated by the beautifully restored skeleton of the Callabonna specimen in the special case; whilst the ancient and curious marsupial, *Wynyardia*, was noted. The Moa skeletons, a collection now of great value, excited some interest, in regard to the variation in the leg bones. Another noteworthy exhibit is the restored skeleton of the Madagascar Moa, *Aepyornis*, with its gigantic egg, that equals 129 of the ordinary breakfast egg. This bird is supposed to be related to the Australian Emus and Cassowaries.

Several interesting fossil specimens were then examined in the Palaeontological Office, where were seen the remarkable collection of Cambrian fossils collected and described by Dr. C. D. Walcott, of Washington:—Remains of ancient seaweeds (*Marpolia*), Bristle-Worms (*Pollingeria*, *Ottoia*); a jelly-fish (*Peytoia*); Bêche-de-mer (*Eldonia*); Brine-shrimps (*Marella*, *Burgessia*); and some remarkable Trilobites (*Neolenus*, *Agnostus*). So wonderfully preserved are these remains of countless ages past, that even the form of the hepatic glands are to be seen on the crustacea, and the delicate markings on the surface of the umbrella of the jelly-fish.—Truly the revelations of scientific discovery are limitless.—F. CHAPMAN.

SEA-BORNE SEEDS

An exhibit by the Rev. Geo. Cox, at June meeting of the Club indicates that systematic searching of our beaches would add to the knowledge of seed dispersal. Mango seeds were found at Mornington; and the seeds of many other plants have been noticed, by different observers, on bay and ocean beaches. We give, as well as receive, sending flotillas of seeds from our shores bound for any ports or havens to which chance and ocean currents may bring them.

Australian trees, whose seed cones were jetsam, form a conspicuous feature of the coastal flora of British East Africa, according to Dr. J. W. Gregory. In front of the Residency at Lamu, he saw some Casuarinas. But these had been planted artificially. On the coast at Mareruani, however, the traveller found, on the headland, a clump of sheoaks; and subsequently noticed others, in similar positions at all points on the coast where he landed, as far south as Natal.

The cones of these immigrants, "must have been carried from Australia by the West Australia and the 'Equatorial Drift' currents, and washed upon the shore." (*The Great Rift Valley*, p. 285)—C.B.



“The Wild Animals of Australasia” is the title of a book (to be published by George G. Harrup and Co. Ltd., London, this month), that should interest nature lovers and students of natural history alike. The authors are Mr. A. S. Le Souëf, Director of Taronga Park, Sydney, and Mr. Harry Burrell, noted for his studies of the Platypus in its natural state and in captivity. The work will contain also a section on the Bats of Australia and New Guinea, by Mr. Ellis Le G. Troughton, of the Australian Museum, Sydney. There will be many diagrams, and a large number of illustrations from photographs. The published price will be 21/-.

INDIGENOUS FLEAS.

All our native animals are more or less infested with fleas, and some have species peculiar to them, for example, the Echidna. Fleas must be sought for while the animal is still alive, or at least warm, as directly the body becomes cool the parasites leave it in quest of another host. The method generally employed in collecting fleas is to place the host in a bag, or other receptacle, in which a few drops of chloroform have been sprinkled. The fleas hastily come to the surface of the fur, and drop off. With a live animal, of course, care must be taken that it is not subjected to the action of the chloroform for too long a time. A large bush rat, recently secured at Belgrave, was acting as host to eight or nine fleas belonging to two distinct species, and one of the specimens was indeed a giant. These I sent to my friend, Dr. E. W. Ferguson, of Sydney, who is making a study of the indigenous flea fauna. He reports that the very large example from the rat belongs to the genus *Macropsylla*, the others being referable to the genus *Stephanocircus* (they are not the common species, *S. dasyuri*). From the same rat, I also obtained a small reddish-coloured tick, which had taken up its quarters on the inside of the animal's ear.—F. E. WILSON.

THE DRONGO IN VICTORIA.

Records of the occurrence of the Spangled Drongo, *Chibia bracteata*, in Victoria are few, and it is interesting to know that a specimen of this curious and beautiful bird was obtained recently at Lakes Entrance ("Nature Notes," *Argus*, 18/6/26). The Drongo is a familiar species in Northern New South Wales and Queensland; but cannot be regarded as more than an occasional visitor to our State, and an "accidental" one to Tasmania. In the far eastern forests, where one may pass from Victoria into New South Wales unwittingly, this species and several other northern birds have been collected, or observed, and happily, allowed to live. It is a pity that rare visitors are not always recorded without the aid of a gun.

On Dunk Island, in Rockingham Bay, Queensland, I saw the Spangled Drongo at home. "The Beachcomber" has described it so well that other word portraits are not needed. To a southerner, *C. bracteata* appears a strayed wanderer from the Indian region, for Drongos are among the commonest of birds in India. They are aggressive birds, bullies, but courageous. No sight is more familiar in India, says Douglas Dewar, than a pair of Little Drongos, *Dicurus ater*, chasing a kite or a crow ("*Glimpses of Indian Birds*," p. 236). The Spangled Drongo I have seen chasing other birds much larger than itself, and annoying lesser kinds. But, as the late Mr. Banfield observed, "the Drongo is a bird of many moods." It is in the nesting season that he becomes noisy and troublesome to other birds of his neighborhood." He is a master of acrobatic flight; a most entertaining fellow, with a medley of musical notes, uttered freely during his aerial performance. —C.B.

AN INTERESTING ORCHID "FIND."

The Rev. H. M. R. Rupp, of Paterson, N.S.W., found growing on the hills near Martin's Creek, Paterson Valley, N.S.W., two species of *Pterostylis* (Greenhoods); one, a large-flowered type; the other, a very small type of plant. Specimens were sent to Dr. R. S. Rogers and to myself for examination and opinion. Strangely enough, we all three arrived at practically the same conclusion regarding them: That the larger type is undoubtedly Robert Brown's *Pt. revoluta*, and that the small type is Brown's *Pt. reflexa*. Both species are figured in Fitzgerald's *Australian Orchids*, Vol. 1. Dr. Rogers writes saying that he has compared the small types with the original specimens of *Pt. reflexa*, collected at Port

Jackson (N.S.W.) by Robert Brown, in 1804, and that they agree exactly. In relation to these species of *Pterostylis*, Alex. G. Hamilton writes in his paper on "Orchids of the Mudgee District, N.S.W."—"Two well-defined types growing together at Guntawang, which I took to be distinct species. . . . But Bentham says that they run so much into one another that it is impossible to sort them into different varieties even. Morphologically, there is little difference between the two types." So it would seem that the type so long known in Victoria and South Australia (see Figures in *Introduction to the Study of South Australian Orchids*, p. 8, and *Victorian Naturalist*, July, 1925, p. 62) can no longer be regarded as *reflexa*, and a new name will, in all probability, have to be given to this comparatively large type, which is, most certainly a distinct species, and is recorded in the *Victorian Naturalist*, Vol. xxviii, 1915, p. 231, as *Pt. Praecox* (alata), var. *robusta*.—W. H. NICHOLLS.

A JUNE DAY AT DARTMOOR

Winter sunshine, a new field to explore, and leisure for rambling made my day at Dartmoor last month as pleasant as a naturalist could desire any outing to be. The district may be familiar to many other Club members; but to me it was "virgin soil," and in our journal, apparently, little has been recorded of this part of South-Western Victoria. In September, 1916, Mr. J. W. Audas visited the Portland district, and all botanists who think of spending a holiday there, should read his paper in the *Naturalist*, March, 1917. He gives an excellent survey of the plant life; and though my ramble was over different country, the flora of Portland and district doubtless does not differ from that of Dartmoor, on the Heywood-Mt. Gambier line.

Fern hunting, I found the lovely little rock-fern, *Asplenium trichomanes*, growing freely in dry or moist crevices of a cliff-face—the big hill near the Glenelg River bridge, and overlooking the railway. Deep-rooted in cracks hardly wide enough to admit a stout knife-blade, the spleenworts' fronds formed green tracery on the limestone. Some were close to the ground; others—the finest specimens—inaccessible without rope or ladder. In marshy spots along the river, in the township, other ferns grew, but none new to me. I botanised only "by the way," and kept no record of species. But I noticed in crevices of great boulders, at the base of the caves near the river, west of the falls, both the

Common Spleenwort and the delicate Rue fern, *Anogramma leptophylla*. Hairy bracken, *Pteris comans*, was there too, among the rocks, and its companion, here and there, was *Correa speciosa* blossoming. Noble bushes of the *Correa* grew on shelves of limestone, not shaded, but in sunshine. Shallow caves, these by the river, with trees and shrubs above and below, but within, lacking plant life.

Birds were not abundant, and all the species observed were old friends, as the Crimson Parrot, Grey Thrush, Collared Butcher-bird, Magpie-lark, Thornbills, etc. The swamps further west, in nesting time, I was told, are "thick with birds," ducks, Pelicans, and other water-lovers. Here the Native Companion still occurs in numbers; the swamps at present are safe for them, but as the South-West becomes better known, it is feared, cranes and other haunters of the swampland, will suffer. Game laws may not protect them from all who motor along the Prince's Highway. "It's fellows from the city, not residents, who are bird enemies," a Dartmoor man declared.

Rambles round Dartmoor, pleasant in winter, must be delightful in spring and early summer. It's a good district for the naturalist, and extending his excursions towards the border, he will be rewarded still. I went to Puralka, to examine the shallow caves, where Mr. J. S. Lockie recently found fossil bones of extinct species of *Macropus*, and other marsupials. A report of his discoveries, including a worked flint, possibly a prehistoric implement, was published in "The Herald." This locality, I commend to fossil hunters especially; and those who are interested in relics of the aborigines. In one paddock, Mr. Lockie showed me many old mia-mia sites, and we picked up scores of scrapers. Stone axes sometimes are revealed by the plough down Dartmoor and Puralka way. The paddock mentioned above, must have been a favourite resort of the lost tribes. They had good hunting around the swamps; and kangaroos even now are plentiful in the open forest country.

The Glenelg at Dartmoor is a picturesque stream; its grandeur is seen along reaches nearer to the sea. The Club might arrange a week-excursion to the South-West, making Dartmoor the centre. Mr. H. V. Richter, of Dartmoor, who showed kindness to a naturalist on the prowl, is keenly interested in his district. Any members of the Club who go there may rest assured of a welcome to Dartmoor.—CHARLES BARRETT.

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EXCURSIONS.

SATURDAY, JULY 10.—Selby. Cancelled, owing to the fact that the gully it was proposed to visit was swept by bush fires, which destroyed practically all cover where the lyre-birds nested last season.

SATURDAY, JULY 24.—National Museum. Object: Zoology.
Leader: Mr. J. A. Kershaw. Meet at Museum at 2.30 p.m.

SATURDAY, AUGUST 21.—Black Rock. Object: Botany.
Leader: Mr. J. W. Audas, F.L.S. Meet at Flinders Street Station, 2 p.m.

Members are invited to suggest localities for Club excursions. The new programme will be prepared shortly, and help will be appreciated by the Committee. Address letters to the Hon. Secretary.

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The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

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Hon. Editor: CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 9th AUGUST, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS:	PROPOSER:	SECONDER:
Mr. Geo. Hawkins, Winmallee Road, Balwyn.	Mr. L. L. Hodgson.	Mr. P. R. H. St. John.
Mr. M. J. Woodhouse, 34 Andrew Street, Windsor.	Mr. E. E. Pescott; F.L.S.	Mr. C. French, Jr.
Miss I. Wilkinson, Chief Commissioners' Office, Police Dept., Melbourne.	Mr. E. E. Pescott, F.L.S.	Mr. C. French, Jr.
Miss M. Carlile, Town Hall, Melbourne.	Mr. E. E. Pescott, F.L.S.	Mr. C. French, Jr.
Miss A. Malesky, Vauxhall Road, Canterbury.	Mr. F. B. Suther- land.	Mr. L. L. Hodgson
The Misses Keartland, 66 Gipps Street, East Melbourne.	Mr. C. French, Jr.	Mr. L. L. Hodgson

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Please remember that notes are required for the "Naturalist."

6. Reading of Papers and Discussion thereon.

1. "A New Victorian Orchid," by W. H. Nicholls.
2. "Rambles in the Lorne District," by L. L. Hodgson.
(Illustrated with Lantern Slides.)

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to inform the Secretary of the same, so that he may arrange to have it brought before the meeting; such notices should, however, be brief.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

SUBSCRIPTION RULES.

Subscriptions for the current year became due on May 1st, and the Hon. Treasurer will be glad to receive them at the earliest convenience from all members who have not already paid.

Attention is directed to the following rates, and extracts from the rules relating to subscriptions:—

Ordinary members, with Journal	20/-
Ordinary members, without Journal (where more than one in a household)	10/-
Country members, with Journal (residing outside 15-mile Melbourne radius)	12/6
Associate members (over 16 and under 20), with Journal	7/6
Associate members (over 16 and under 20), without Journal	5/-

5. All subscriptions shall become due on the first day of May in each year.

6. no person who has been elected shall be entitled to the privileges of a member until his subscription shall have been paid, or while his subscription is in arrears.

7. Persons elected after the first November shall be entitled to the privileges of membership on payment of half the annual subscription.

The Victorian Naturalist

VOL. XLIII---No. 4. AUGUST 5, 1926.

No. 512.

FIELD NATURALISTS CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, July 12, 1926. The President (Mr. E. E. Pescott, F.L.S.) occupied the chair, and about 100 members and friends were present.

CORRESPONDENCE, ETC.

From Mr. Alfred D'Alton, Hall's Gap, stating that the cutting of grass-trees was being carried out in the southern end of the Grampians, but that no damage to the native flora was likely to occur.

From Mrs. G. A. Keartland, thanking the Club for expressions of sympathy with her in her recent bereavement.

Mr. P. R. H. St. John moved that Mr. J. W. Audas, F.L.S., be appointed a delegate of the Club to the Perth meeting of the Australasian Association for the Advancement of Science, in place of Mr. J. A. Kershaw, who intimated that he would be unable to go. The motion was seconded by Mr. C. French, Jnr., and carried unanimously.

A report on the visit to the National Herbarium on June 19 was given by Mr. J. W. Audas.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. A. C. Nilson, 58 Speight Street, Newport; Dr. R. M. Wishart, Riversdale Road, Glenferrie; Mrs. E. Hanks, 736 Sydney Road, Coburg; and Mr. D. Blair, 59 Patterson Street, Middle Park, were elected as ordinary members.

GENERAL.

It was resolved, on the motion of Mr. J. W. Audas, seconded by Mr. H. B. Williamson, that it be a recommendation to the Committee that part of the proceeds of the Wild Flower Show, to be held on October 5th next, be devoted to charitable purposes. The President announced that His Excellency the Governor and Lady Somers, had accepted an invitation to attend the Show, and that His Excellency had consented to perform the opening ceremony.

The Hon. Secretary read the minutes of the meeting at the Herbarium on June 29th, held for the purpose of forming an Orchid Section of the Club.

Mr. C. Daley moved: "That the area known as Sherbrooke Forest and Gully, be proclaimed a permanent National Park and a sanctuary for all native birds and mammals." The motion was seconded by Mr. F. E. Wilson, and carried unanimously.

Mr. C. Barrett moved: "That Sir Frank Clarke be invited to arrange for and introduce a deputation to the responsible Minister, to place the views of the Club before him." Mr. L. L. Hodgson seconded the motion, which was agreed to without a dissentient.

Mr. W. F. Gates referred to the Dandenong Police Paddock, which would become ordinary Crown Lands again in a few months. He moved that the Club support the Town Planning Association in its efforts to have this area created a reserve. Mr. W. Thorn seconded the motion, which was carried unanimously. It was also resolved that a letter be written to the Lands Department regarding this matter.

LECTURETTES.

The President delivered a lecturette on the ferns and other flora of Sherbrooke Gully and surroundings, and referred to the many and varied beauties of this popular resort. Mr. C. Barrett followed with a short lecture, dealing with the birds to be found in the locality. Both lectures were illustrated with lantern slides.

EXHIBITS.

By Mrs. E. Coleman: (1) Specimens of *Pterostylis Toveyana*, Ewart and Sharman, showing flowers closely resembling *P. alata* in colour, shape, and structure, but with stem-leaves broadly ovate, as in *P. concinna*. (2) Specimen of *P. Toveyana* with leaf-development narrow-linear, as in *P. alata*, but with flower resembling *P. concinna* in shape and colour. (3) Specimen of *P. Toveyana*, with three lower leaves broadly lanceolate, showing resemblance to leaves of both *P. concinna* and *P. alata*, the two upper leaves narrow-lanceolate, as in *P. alata*. (4) *P. Toveyana* buds from groups 1 and 2, latter showing that stem-leaf development is present in immature plant. (5) *Pterostylis alata*, Reich. f., for comparison. (6) *P. concinna*, R.Br.

By the Rev. G. Cox: (1) Native stone implements from Somerville and Cape Woolamai. (2) Walking fish from Gladstone River (Queensland). (3) Coastal tea-tree in bloom, from Mornington.

By Mr. C. Daley: Egg-cases of the Bird-dropping Spider (*Selena excavata*), on which the mother-spider kept continual watch for at least six months. First

observed in February, when there were eight egg-cases; abandoned in June, when there were 13 egg-cases in the group.

By Mr. A. E. Rodda: Fungi growing in outcropping mudstone from Mitcham.

By Mr. E. E. Pescott: Cultivated specimen of Bushy Heath Myrtle—*Thryptomene* (*Mitchelliana*) *Calycina* (F.v.M.).

By Mr. H. Borch: Six pupae of *Troides euphorion*, from Cairns district, North Queensland.

By Mr. L. L. Hodgson: Opossum trap, found set during close season, in Sherbrooke Gully.

EXCURSION TO NATIONAL HERBARIUM.

On June 19th, 25 members of the Club visited the Herbarium. Some notable specimens were exhibited, plants collected by Banks and Solander in Australia in 1770, and by Robert Brown in the years 1802-5; also a set of plants from Samuel Petiver's Herbarium, gathered in India and North America more than 200 years ago, and described in the *Philosophical Transactions of the Royal Society*, at the beginning of the 18th century. Some attention was devoted to the library, which now contains more than 10,000 volumes. The National Herbarium ranks among the leading ones of the world. The shelves are carefully numbered, so that there is no difficulty in finding any desired plant. The facilities for reference to the contents of the Herbarium were fully demonstrated. During the afternoon a paper on the Herbarium and its uses, was read by the leader.—J. W. AUDAS.

Mr. Alfred D'Alton (Hall's Gap), replying on June 25 to the Hon. Secretary's letter with reference to grass trees being cut in the Grampians for commercial purposes, said: "I believe this is being carried on in the southern end of the Grampians. I do not think any damage will be done to native flora, as the best and rarest of our flowers do not grow on grass-tree country."

The following donations to the Club's funds have been received since the beginning of the financial year:—Mr. J. E. Dixon, £1; Mr. F. Pitcher, 10/-; Mr. A. J. Tadgell, £2; and Mr. A. E. Keep, £5.

Greenhood Orchids of Victoria

BY W. H. NICHOLLS.

Part II.

NOTE.—*Pt. Toveyana*, "Ewart," a small, ill-defined species, mentioned in Part I. of this paper, has been found growing in a new district (Frankston). For specimens, I am indebted to Mrs. E. Coleman.

Two of the 14 species dealt with in this concluding part of my paper, are very rare. *Pt. squamata*, R.Br., and *Pt. furcata*, Lindley. The former I have not seen in a fresh state, and its existence in Victoria is doubtful. There are no Victorian specimens of either plant in our National Herbarium; though both have been on our records for many years. Dr. Rogers records *Pt. furcata* from at least two Victorian districts. But recorded Victorian specimens of *Pt. squamata* do not exist.

In the Herbarium, a Tasmanian plant is preserved. A note is attached in the late Baron Sir Ferdinand von Mueller's own handwriting: "This is the true *Pt. squamata*, R.Br.!" To me, it seems to agree with Dr. Rogers' *Pt. pusilla* (a smaller type)—the flowers have no caudæ to the sepals! Magnified, the ciliated apices of the two pear-shaped swellings, with the deep channel between, are seen on the reverse side of the rather short, ovate labellum. (See illustration.) These details are at variance with the published descriptions of Robert Brown's species.

Pt. acuminata, R.Br. (Fig. 16.) (Pointed).

The type form of the Pointed Greenhood is a slender plant, from 6 inches to 10 inches in height, with a flower somewhat closely resembling in shape and coloration *Pt. nutans*, R.Br., but without the nodding habit which characterises that familiar species. Apex of galea shortly pointed, labellum glabrous (or pubescent), oblong-linear, recurved or semi-circularly recurved, projecting through the acute sinus of the lower lip, tip sharply pointed. Lower lip, narrow, wedge-shaped, the lobes embracing and exceeding the galea; tips, acuminate, not very long. Stem-bracts, minute, sheathing, 1-2. Basal leaves usually oblong-lanceolate, or lanceolate.

Though a few records exist of this species having been found in Victoria during the autumnal months (the normal flowering time for the species in N.S.W. and Q'ld.), specimens have not been seen for a considerable period, and the species has been regarded as extremely rare, if not extinct. A few years ago a Greenhood was discovered in several parts of this State, S./N.E./N.W. (between the months of August and December), and in considerable numbers in some districts. It was first considered to be a hybrid. The labellum is pubescent, with a blunt tip, and the flower usually in a very slight nodding position. It is of very variable habit, and is occasionally rather stout, with well-marked stem-leaves, as in *Pt. furcata*, Lindley. Experience with the forms from N.S.W. and Queensland showed that our "spring" flowering form cannot be separated, and must be regarded as a variant form of the above species.

Victoria, New South Wales and Queensland. Combined flowering periods: March-December.

Pt. grandiflora, R.Br. (Fig. 17.) (Large-flowered).

The rare Long-tongued Greenhood does not bear the largest flowers, but doubtless it is the handsomest of the Greenhoods. The plant grows from 6 inches to 15 inches in height, and has long lanceolate stem-leaves. It is restricted to moist mountain gullies and other situations where abundant shelter is provided. It has a distinctive type of labellum. (See illustration.) The green and rich red-brown colour-scheme, combined with the beautiful veining of the widely dilated tips of the paired-petals, give to the single flower a charm all its own. For a vernacular, I suggest "Veined Greenhood." Basal leaves (rarely present in the flowering plant) appear from the thickened scape, as a lateral growth.

Victoria, New South Wales and Queensland—May-July.

Pt. ?? (Fig. 18.)

The Striped Greenhood. Plant from 2 inches to 14 inches in height; stem-leaves usually 4-5, narrow-lanceolate, somewhat rigid, clasping at the base, lower ones bract-like. Flower large, solitary, white, and clearly (often firmly) striped with dark green and some purplish or brown markings. Labellum narrow-lanceolate, tapering to a fine point. Pale in colour. Radical leaves similar in shape to *P. alata*'s, but margins not crisped.



16—*Pt. acuminata*, R.Br. (autumn). 16a—*Pt. acuminata*, R.Br. (spring). 17—*Pt. grandiflora*, R.Br. 18—*Pt.* (new species). 19—*Pt. revoluta*, R.Br. 20—*Pt. longifolia*, R.Br. 21—*Pt. vittata*, Lindl. 22—Radical leaves of *Pt. alata*, Reich. 22a—Tri-leaved type of radical leaves of *Pt. alata*.

NOTE.—Radical leaves and labella marked with corresponding figures. Labella not drawn to scale correspondingly.

Victoria, South Australia, and Western Australia—April-October.

NOTE.—This plant has been known for many years as *Pt. reflexa*, Br., but the re-discovery recently, in the Paterson district, N.S.W., of a small Greenhood, agreeing in all particulars with the original plants, that Robert Brown collected at Port Jackson, in 1804, has reopened the question of the identity of this large-flowered plant, which seems to be abundant in many parts of Victoria, also South Australia and Western Australia. Dr. Rogers, to whom the question was referred, agrees also that this plant, which has been described by Prof. Ewart (Melbourne University) as *Pt. praecox* (*alata*), var. *robusta*. (*Proc. Roy. Soc., Vic.*, Vol. xxviii., *New Series*, 1926) is distinct, and must now be regarded as a new species. See also *Pt. revoluta*, R.Br. (Fig. 19).

Pt. revoluta, R.Br. (Fig. 19)... (Revolute).

The Autumn Greenhood. A very graceful, normally single-flowered species, which, more often than not, is found growing in a solitary state. The large flower is white, with green stripes and some light-brown markings (often absent in succulent forms); the stem is almost leafless. Plant usually between 5 inches and 12 inches in height. This Greenhood is widely distributed throughout Victoria and New South Wales, and after good late summer rains, it usually flowers abundantly, sometimes occurring in fairly large colonies. The flowering period is during March, April, and May, and the species is seen at its best in its alpine form, growing on rocky ridges. Alpine examples are much hardier (less succulent) than some of the lowland specimens.

This species has been known for many years, having been confused with *Pt. reflexa*, Br., a much smaller plant, which is restricted (as far as it is at present known) to New South Wales and Queensland. Bentham, who had access to Robert Brown's types, would not accept them as variant species, and included these and other similar species (incl. Fig. 18) under the one specific name. The differences, he concluded, were not sufficient to justify separation. Critical examination of all parts of living plants of both species, has convinced me that the earlier botanist was fully justified in his decisions. The radical leaves of *revoluta* are oblong-lanceolate, those of *reflexa*, broadly-ovate, with crisped margins. There are many differences in the details also.

Victoria and New South Wales—March-May.

Pt. longifolia, R.Br. (Fig. 20). (Long-leaved).

The Tall Greenhood is restricted to moist, well-sheltered gullies, and shady places in our woodlands. Often it grows among almost impenetrable scrub, and the branches of fallen trees. It is easily recognised by its very long, lanceolate stem-leaves, and very small, greenish flowers. Plant usually from 6 inches to 18 inches in height, but in favourable situations, up to 2 feet or more. Stem-leaves longest near the middle; those within the floral cluster reduced to acute bracts; those at the base of stem scale-like. Flowers usually from 4 to 8; conjoined sepals in a pendent position (as in *Pt. rufa*, etc.); lobes rather shortly pointed, occasionally tipped with red; labellum, glandular, laterally lobed, tip bifid; base very thick, very irritable; lateral growth of leaves sometimes present in the flowering plant.

All States (excluding Western Australia)—July-October.

Pt. vittata. Lindley. (Fig. 21). (Banded).

The Banded Greenhood is not regarded as a common plant in Victoria, though it is sometimes fairly numerous in a few coastal districts, and it also occurs on some of our mountain ranges. Similar, in general appearance, to *Pt. longifolia*, Br.; but in *vittata* the habit is stouter; the lanceolate stem-leaves are much broader and those within the floral raceme much longer. Plant usually from 5 inches to 15 inches in height. Flowers usually one to eight; in a nodding position, usually reddish-brown, and distinctly banded across the upper part of the galea; conjoined sepals pendent, tips acute; labellum, broadly-oblong, glandular, with a single short spike protruding from the much thickened base; very irritable. Radical leaves ovate-oblong or oblong-lanceolate.

All States—May-July.

Specimens of this species from Point Lonsdale, June, 1923(?), collected by Mr. G. Ampt, had numerous flowers of a grey colour, agreeing in these respects with the Western Australian plants.

P. alata (Labill), Reich. (Fig. 22). (Winged).

(*Pt. praecox*, Lindley).

The Purplish Greenhood is the daintiest of the small single-flowered species. Widely distributed, growing chiefly within the shelter of trees or shrubs. Plant usually between 4 inches and 10 inches in height. Stem-

leaves small and bract-like, rarely longer than $1\frac{1}{4}$ inches. No basal leaves at flowering time. Flower usually solitary, and with dark-green, longitudinal stripes, and some purplish or brown markings. Specimens received recently from Tasmania had dull sage green striae on a grey ground; other markings being of a light rufus tint. Galea erect, sometimes (chiefly in small flowers) incurved. Tip short, lower lip erect, the filiform points exceeding the galea and hooked forward at the tips. Labellum brownish, lanceolate, almost straight, with an acute point; tip not protruding beyond the wide abrupt sinus of the lower lip; column of sturdy form, usually green. Radical leaves, broadly ovate, or ovate-lanceolate; margins crisped.

Victoria, New South Wales, South Australia, and Tasmania—May-July.

Fig. 22A, a type of plant observed, so far, only in dry seasons, and only in those species of Greenhoods, having no basal leaves during the flowering period. On the basaltic and granitic formations, where conditions the reverse of congenial often prevail, they are frequently met with, and in considerable numbers in the following species, *Pt. truncata*, Fitz., and *Pt. ? new species*. (Fig. 18). Five such plants of *Pt. alata*, Reich. (as illustrated) have been found by Mr. A. B. Braine, in the Ashburton district (June, 1923.) Observations on collected specimens and in the field support the view that these tri-leaved plants are representative of the interrupted growth caused, no doubt, by the abnormal conditions prevailing, prior to the flowering period. In a normal season, these plants would unquestionably have produced flowers (a rudimentary bud is apparent in many of them); the energy of the plant having been diverted, through the late season.

Pt. cucullata, R.Br. (Fig. 23). (Hooded).

The Leafy Greenhood is not a very common plant, but in some localities may be gathered in considerable numbers. I have, so far, received it from but two Victorian localities—Broadmeadows and the South Coast (near Rye). It derives its specific name from the large upper bract, which sometimes envelopes the ovary and portion of the large flower; suggesting, then, the typical monk's hood. The plant is variable in height, measuring from 2 inches to over a foot. The stem is well-protected with



22—*Pt. alata*, Reich. 23—*Pt. cucullata*, B.Br. 24—*Pt. furcata*, Lindl. 25—*Pt. rufa*, R.Br. 26—*Pt. pusilla*, Rogers. 27—*Pt. Mitchellii*, Lindl. 28—*Pt. squamata*, R.Br. 29—*Pt. nana*. 29a—Lower lip of *Pt. nana* (from inside) showing inflexed lobule.

very long (often succulent) leaves, varying in shape, but usually oblong; those at the base longest and somewhat crowded, sessile or almost so. The single green flower is marked with brown, or a rich cayenne colour. Lower lip erect, wedge-shaped, lobes shortly-acuminate, usually exceeding the galea in the Victorian plants (as illustrated.) Labellum, oblong-elliptical; tip, blunt, slightly recurved, often richly coloured. The largest specimens I have examined came from South Australia: tall, yet sturdy plants, much darker in colouring than the Victorian plants. (*Pt. Mackibbinii*, F.V.M., a synonym.)

Victoria, South Australia, New South Wales and Tasmania—September—October.

Pt. furcata, Lindley. (Fig. 24). (Forked, lateral sepals).

The Forked Greenhood is one of our rarest orchids, and records prove that very few specimens have been found in Victoria. Dr. Rogers reports a specimen from Cockatoo (Dec.), and another from Condah, in the Hamilton district; while the Rev. H. M. R. Rupp, of Paterson, N.S.W., has a robust form of this species in his herbarium; it was collected by him on Mt. Buninyong (near Ballarat) many years ago. There are no specimens in the National Herbarium, excepting two type forms from Tasmania, where the species seems to be less rare.

The plant resembles, in some degree, *Pt. cucullata*, R.Br.; but is much more slender, usually between 4 inches and 10 inches in height, with from 3 to 5 fairly large, oblong-lanceolate leaves, dispersed upwards on the stem, largest near the base; those on the stem, leaf-like bracts. The fairly large, single, flower is greenish, with some brown markings; galea inclined upwards; lower lip wedge-shaped, with the points exceeding the galea; labellum long and narrow, wider at the base; tip rather blunt, very slightly curved, *channelled on each side of the longitudinal ridge on the upper surface*.

Three specimens of this plant were received recently from Tasmania. The labellum and the markings on the fore-part of the galea of all three were of a bluish colour.

Victoria, South Australia, and Tasmania—November-January.

Pt. rufa. R.Br. (Fig. 25). (Reddish).

The Rusty Hood is a hardy plant, with large tubers, which enable it to flourish in the most arid situations, though it is not confined to them. It is the largest of the "Rufa" group, other species being somewhat similar in habit and colouring. Height, from 3 inches to 12 inches. Basal leaves in a withered state when the flowers have opened; leaves shortly petiolate; stem bracts 2-5, acute, loosely sheathing. Flowers 2-5, green with reddish-brown markings. Sepal prolongations vary in length (up to $1\frac{1}{4}$ inches in my specimens), conjoined sepals not embracing the galea, as in most of the better-known Greenhoods, but pendant. On the concave platform formed by their connate parts rests the short sensitive labellum, which is membranous, with tip upturned; margins fringed with short hairs; two long, upright setae at the base.

I received several fine plants of this orchid from the Bendigo district, these have flowered year after year, and I find the green rosette is sometimes retained until the flowers have withered.

Widely distributed, all States—November-December.

Pt. pusilla, Rogers. (Fig. 26.) Very small).

The Ruddy Hood. Plant $2\frac{1}{2}$ inches to $8\frac{1}{2}$ inches high, with a green* radical rosette at time of flowering. A much more slender and smaller plant than *Pt. rufa*, R.Br. Flowers 1-8, smaller, but somewhat similarly coloured. Since first described and illustrated by Dr. Rogers (*Trans. Roy. Soc., S.A.*, Vol. xlii., 1918), larger specimens have been found. Sepals acute, but not caudate; labellum, fleshy, very sensitive, oblong or ovate-oblong; tip straight; lateral margins beset with a few long hairs; tip and apices of the two pear-shaped swellings (between which runs the central trough which marks the under-side most uniquely). shortly ciliate, margins at base, thickly and shortly ciliate. This plant is by no means common, and is never found in colonies of any size.

Victoria, South Australia and Tasmania (?)—September and October.

Pt. Mitchellii. Lindley. (Fig. 27). (After Sir Thomas Mitchell, who discovered the plant in 1846).

*A few plants found in bloom on a dry stony hillside near Wattle Glen (Sept., 1924) had withered basal leaves.

The Mitchell Greenhood is a slender species, 6-10 inches in height, with rather large flowers, 1-6, in a loose raceme; green, with reddish tints; usually much darker than in the other members of this group. Basal leaves in a green rosette, very shortly petiolate. Stem-bracts few in number, 2-4; very small, sheathing. This is not a common plant; it grows on lightly-timbered hillsides. It is at once distinguished from *rufa*, by the (comparatively) larger flowers, and the tails of the conjoined sepals, which are strangely divergent and about 1 inch long. Apex of galea with a fine point about $\frac{1}{2}$ inch in length, recurved. Lower lip, pendant; lobes ovate; labellum, very irritable, slipper-shape, rather thick and fleshy, glandular; tip depressed a little and bifid slightly on the reverse side. The contracted basal portion usually without hairs. Lateral margins sparsely ciliate.

All Eastern States (incl. Tasmania)—August-October.

Pt. squamata, R.Br. (Fig. 28). (Scaly, stem-bracts).

The Scaly Greenhood is an exceedingly rare, glabrous species. Under 10 inches in height, and not unlike some forms of *Pt. Rufa*, R.Br., but having smaller flowers, 1-3, coloured like *rufa*, and more stem-bracts, 6-8. It has also a withered basal rosette at time of flowering. Apex of galea, shortly-pointed; lower lip pendant; lobes about $\frac{1}{2}$ inch in length; labellum ovate-oblong, fleshy, markedly glandular; tip straight, bifid, lateral margins, and sides of the thickened but rather narrow base, beset with long setae, very irritable. Column wings upper margins not toothed or ciliated.

Victoria (?), Tasmania and South Australia—Nov.

Pt. nana, R.Br. (Fig. 29). (Dwarf).

The Dwarf Greenhood was described by Robert Brown from specimens gathered by Colonel Paterson in Tasmania, a little more than a century ago. It is a very slender, dainty species, rigidly erect, usually between 2 inches and 6 inches in height; occasionally 12 inches. Normally, single-flowered, with an inflexed denticular, green, lobule inside the sinus of the lower lip. (See Fig. 29A). Basal leaves in a rosulate cluster, usually found in groups or large colonies at the base of trees in open forest country, and in sheltered positions under shrubs. Dr. Rogers records a find at Albany, Western Australia. The plants were in colonies on the erect trunk of a large *Banksia*. In one case 8 $\frac{1}{2}$ feet above the ground. Probably the result of flood waters.

All the States (excepting Queensland)—July-October.

The National Herbarium, Melbourne.

By J. W. AUDAS, F.L.S., F.R.M.S.

During the year 1857, the Government of Victoria realised the need and importance of a properly equipped State Herbarium. A large building was erected in the Government House Domain, under instruction of the Hon. Captain Pasley, then Minister of Public Works, for the reception of the botanic treasures accumulated by the then Government Botanist, Dr. Ferdinand Mueller—afterwards Baron von Mueller; the private collection formed by him since 1840 also became located there as a gift.

Through interchanges, from results of botanical expeditions, through the liberality of public institutions, and by the purchase of Dr. Sonder's Herbarium, these collections (vast already in 1857) became so extensive that, at the present time, the number of sheets containing the pressed and dried plants can be estimated at one and a-half millions. The Herbarium is now equal to any of the few really grand Herbaria in other countries, while it far exceeds any other in the number of Australian specified forms. The whole collection is arranged according to the systematic Census of Australian Plants, by Baron von Mueller, the Census serving as an index for the Australian collection. The extra-Australian, New Zealand, Papuan, and Polynesian divisions of the Herbarium are each kept separate—such precious possessions as these must by no means be considered as transient, or, under ordinary care, as perishable—indeed, in some of the Continental Herbaria specimens are preserved quite uninjured, though collected fully 300 years ago.

Our own collection contains numerous plants which were prepared by Ehrhart, Thunberg, Giseke, and other disciples of Linnaeus, and by the pre-Linnean botanist, Petiver, who died in 1718; also some collected by Robert Brown in Australia, during the years 1802-5; and by Banks and Solander in 1770. The Australian collection is kept separate from the extra-Australian collection, to facilitate access for daily reference in studying the flora of the Commonwealth.

The names of the contributors towards the Australian portion of the Herbarium, can be gathered from the *Flora Australiensis* and the *Fragmenta Phytographiae Australiae*. It is, however, worthy of special remark that the large array of Western Australian plants of Drummond, Oldfield, L. Preiss, Maxwell and Max Koch, is most extensively represented in our Herbarium.

As regards New Zealand plants, we are fortunate in possessing collections from Dr. Sinclair, Sir Julius Haast, Professor Kirk, R. and G. Forster, and Mr. J. Buchanan. In reference to the extra-Australian plants in our possession, their intrinsic value may be recognised when it is stated that there are at least 200 distinguished botanic celebrities in whose gains we were able to share. The contributors include Asa Gray, Agardh, Beccari, Cooke, Ecklon, Engler, Fenzl, Hampe, Sir Joseph Hooker, Kotschy, Lehmann, Lindley, Moritzzi, Philippi, Reichenbach, Schimper, Torrey, Wallich, Zeyher, and many others. The object of accumulating such large stores of prepared plants is not to satisfy idle curiosity, but to trace, at any time, characteristics of any plant of either hemisphere.

1. To demonstrate the range of any particular plant over whatever portion of the world it may be indigenous.
2. To identify the description of any plant in any work at any time with original and possibly with typical or authenticated specimens.
3. To institute by comparison even into minute details the precise names of any species whatever their position in the botanic system may be.
4. To guide to a recognition of any plant whether for medicinal, forestal, pastoral, technologic or any other purposes.

Nearly the whole system of records of the world's vegetation rest on such material, for only in our Herbarium can we bring together the plants of the whole globe, for connected studies—the number of species constituting the flora of the world being not less than 200,000, irrespective of varieties and exclusive of mosses, lichens, fungi, and algae.

There is no botanical museum attached to the Herbarium, though this is a very useful adjunct, as it teaches

us to appreciate the general relations of the vegetable world to man. At the Royal Botanic Gardens, Kew, the most extensive economic museums in the world are situated. To illustrate their usefulness, I may cite as an example the Cocoanut palm *Cocos nucifera*. There are pictures showing the tree as it grows, near the sea, in tropical countries; also portion of the trunk, just as it comes from the tree. Then come examples of innumerable things made from the most valuable of all palms. There are samples of cocoanut oil, with soap and candles made of it. Sugar and vinegar made from the sap of the tree, walking sticks and ornamental articles from the wood, various toys and utensils, such as teapots, cups and ladles from the shell of the nut, and samples of the kernels now largely used in confectionery. There are also many articles made from the strong fibres of the husk, such as mats and matting, ropes and rough cord, handbags and brushes. The native races also make various articles of dress and ornamental material from one part or other of this palm.

At the Herbarium we have a fine library, containing valuable books, more than 10,000 volumes, by Linnaeus and other authors up to the present time; also works by several pre-Linnean authors. These books, in the main, deal with botany, but especially that branch of botany which treat of the classification of plants. Included, also, are several books of travel, which contain more or less botanical matter. Though the books are mainly necessary for carrying on the practical work of the Herbarium, the early authors, whose writings are chiefly of historic interest, are well represented.

Mention might be made of the following:—

Stirpium Historiae Pemptades, by Dodonaeus. Published in 1583.

A Voyage to New Holland, by Capt. William Dampier (1699). This interesting little volume contains illustrations of 18 Australian plants. The genus *Dampiera* was named in this navigator's honor by Robert Brown.

Flora Australiensis, by George Bentham. A great work begun by the author in 1863 and finished in 1878. During this long period, Baron von Mueller, collaborating, regularly forwarded all his available collections of Australian flora, with notes thereon, to London. More than 100,000 specimens were despatched, when Bentham examined them and in due course returned them

safely to the National Herbarium, Melbourne. This is a most valuable set, and the standard work on the flora or Australasia. It comprises seven volumes.

Prodromus Florae Novae Hollandiae, by R. Brown (1810). This is one of the most important works ever written on phytography. It contains the notes and the material gathered during the whole of Flinders' memorable expedition, and during subsequent travels of Robert Brown and his companions in New South Wales and Tasmania. Unfortunately, however, the intended second volume of this splendid work never became elaborated, so that scanty fragments only of the most highly developed plants discovered during Flinders' expedition, became known as scattered through other publications; and even in Brown's *Prodromus* the Victorian plants are simply indicated as from the South Coast of Australia, he counting geographically with them all those growing as far as King George's Sound.

Australian Orchids, by R. D. Fitzgerald, F.L.S. A valuable illustrated monograph of the whole of the Australian orchideous plants, comprising about 250 fairly-marked species. The work is dedicated to the memory of Charles Darwin. It contains an explanatory index, literary, etymologic and geographical, noting also the time of flowering. The full-sized figures, are beautifully colored, and accompanied by ample analytic details of the various genera and species.

Mention must be made of some of the very valuable books written by the late Baron von Mueller, who was Government Botanist of Victoria for more than 40 years.

Eucalyptographia, 1878 to 1884, is a work of great value, as it contains illustrations and full descriptions of each species of Eucalypt.

Myoporinous Plants of Australia. This is mainly delineations of each Australian species, comprising 74 illustrations.

Census of Australian Plants. A compilation of all the plants indigenous to Australia; their arrangement, classification and distribution.

Select Extra-Tropical Plants. A volume containing information on plants for industrial culture.

Notes on Papuan Plants, 1875 to 1890.

Key to the System of Victorian Plants. Parts I. and II. This is a useful key for facilitating the study of our native flora.

Iconography of Australian Species of Acacia, 13 decades. A useful work, showing drawings and anatomy of Australian Acacias.

Iconography of Australian Salsolaceous Plants. With drawings and anatomy.

Among other publications of this voluminous writer are:—

Fragmenta Phytographiae Australiae, two parts; *Australian Mosses*, *Plants Indigenous to the Colony of Victoria*, *Plants of Shark's Bay*, and *Forest Resources of Western Australia*.

Botany of Captain Cook's Voyage, three volumes. These volumes contain reproductions from the plates engraved from drawings of plants collected in Australia by Banks and Solander during Cook's First Voyage, in 1768-71, and the descriptions which were drawn up by Solander, during and after the voyage. The Australasian collections are represented by 412 sketches; from these 362 finished drawings were prepared, of which 340 were engraved.

THE LILAC LEEK-ORCHID.

The Lilac Leek-Orchid, described by Dr. Rogers in 1923, is named after a member of our Club, Mrs. Edith Coleman, who is specialising in the study of Australian orchids. The type of *Prasophyllum Colemanae* (Rogers) was collected at Bayswater, 12/11/22. Mrs. Coleman gives the following condensed description of the species:—

Moderately stout, with a rather loose spike of about 21 lavender or lilac flowers. *Dorsal sepal* greenish, the conical point recurved or erect. *Lateral sepals* green, fluted, spreading, very divergent. *Petals* lavender, with a narrow green central stripe, spreading. *Labellum* lavender, margins crenated, widely ovate, nearly sessile. *Column* short, lateral appendages, oblong, falcate and lavender tinted. Another purplish.

Plate III.



Photo by T. Green.]

LILAC LEEK-ORCHID, *Prasophyllum Colemanae* (Rogers).
(Twice Natural Size.)



VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

Part VIII.

Genus ASPLENIUM.

This genus is distinguished by having the sori under an elongated indusium, like a narrow flap along the veins diverging from the midrib. The indusium opens upwards, *i.e.*, on the side facing the midrib.

ASPLENIUM BULBIFERUM, Forst. Mother Spleenwort. (Fig. 1.) All States, except W.A. and N.A. All continents except Europe. Fronds rise 1 foot to 2 feet, from a thick rhizome, and are bipinnate, often bearing at the ends of the pinnae bulb-like swellings (proliferous growths) from which new fronds sprout, and, becoming detached, produce independent plants. Primary pinnae numerous, usually 4 to 6 inches in length. Pinnules about 1 inch in length, toothed or lobed, with a single veinlet to each tooth or lobe. Sori attached to the veins of lobes, with a prominent cover thrown over towards the margin, so as to make the sori appear almost marginal. A dark green, rather tender fern, found in all districts of Victoria, but the North-West. Fig. 1 shows the stalk of a frond with one pinna, the upper end of which is turned over to show the upper side and the attachment of one of the bulb-like processes.

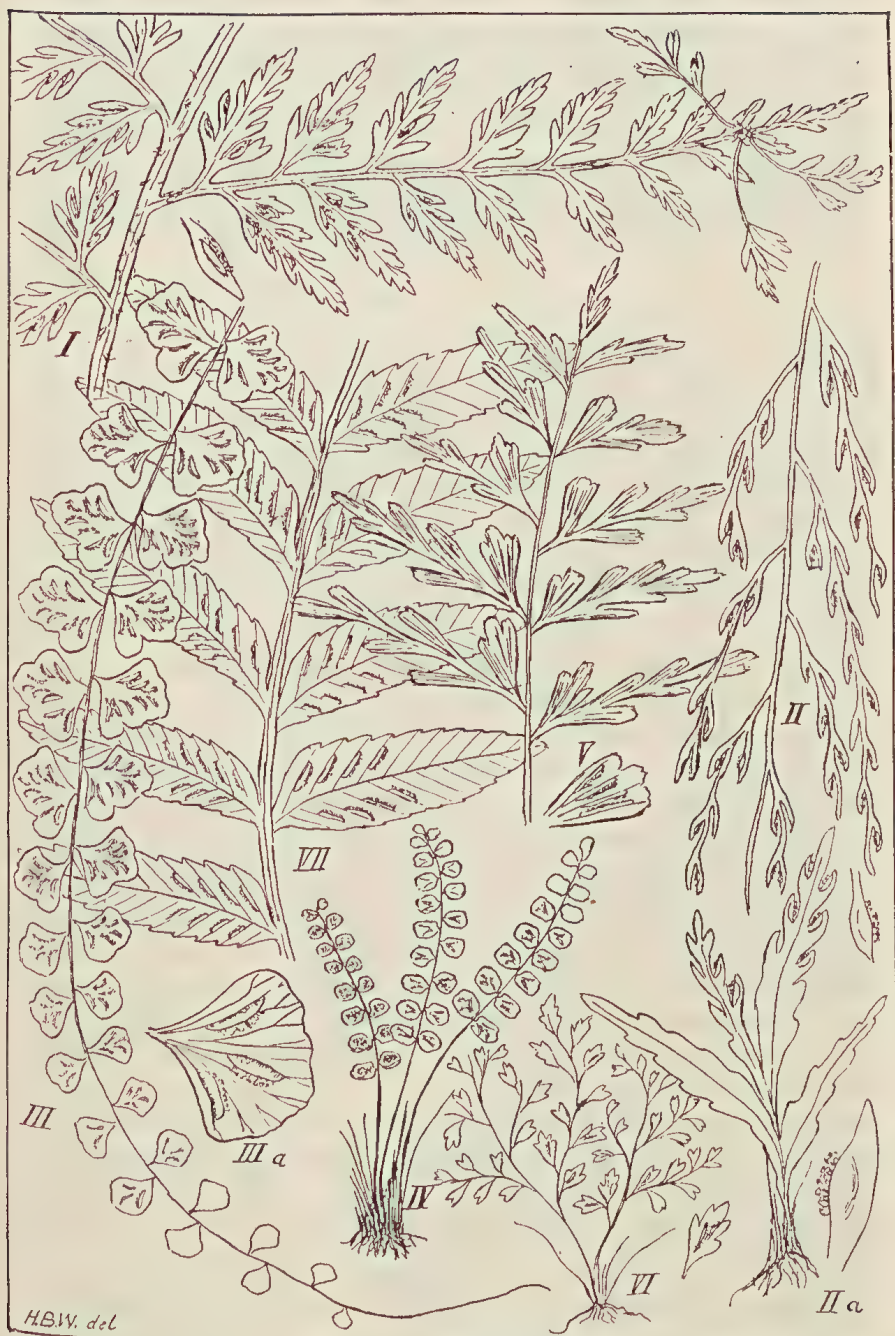
ASPLENIUM FLACCIDUM, Forst. Weeping Spleenwort. (Fig. 2.) N.S.W.; Tas.; N.Z.; Af.; Polynesia. A pale-green, glabrous fern, found often pendent from tree-trunks. In New Zealand this fern is represented by 5 or 6 very divergent forms, "from the great pendulous frond hanging three feet from a tree-trunk, to the stiff, upright, spiky little plant a few inches high." In this State the extreme forms are represented except, perhaps, that the pendent form is scarcely as luxuriant as in New Zealand. The fronds are from 1 foot to 2 feet, and pinnate. The pinnae are very narrow, barren ones toothed, fertile ones with lobes about $\frac{1}{2}$ inch in length. The sori resemble those of *A. bulbiferum*, but the conspicuous indusium is thrown over so far as to make them appear marginal, and often they become visible from the upper side of the frond. Found in the South and East of the State.

APSPLENIUM FLABELLIFOLIUM, L. Necklace Fern. (Fig. 3.) All parts of Australia except N.A. Not known outside Australia and New Zealand. This is the long, necklace-like fern, which is found in all districts of the State, but the North-West, trailing from shelves in rocks, with fronds sometimes a foot in length, with small, fan-shaped pinnae, and the end of the rachis or stalk often produced to some length bare of pinnae. The pinnae are short-stalked, obliquely fan-shaped, bluntly-toothed and sometimes three-lobed, up to 1 inch in length and breadth. The sori, usually 7 to 9 to each pinna, are along the diverging veins, and the indusium is conspicuous, and opens towards the midrib. Fig IIIa shows the typical indusium of *Asplenium*.

ASPENIUM TRICHOMANES, L. Common Spleenwort. (Fig. 4.) Vic.; N.S.W.; Tas.; N.Z., and all continents. This resembles *A. flabellifolium* in having pinnate fronds with small roundish segments, but it is a small, tufted plant, with black, rigid frond-stalks, and less membranous segments, which are always sessile, somewhat like *Lindsaya linearis*. The fronds are from 2 to 6 inches in height, and the pinnae about $\frac{1}{4}$ inch in length and breadth. Sori few, 4 or 5, on diverging veins, distinct when young, uniting in a circular mass when old. There are specimens from Buffalo Mts., Upper Murray (Cobberas, H.B.W.), and the Grampians. Recently Mr. C. Barrett collected it from rocky banks of the Glenelg River, at Dartmoor.

ASPENIUM PRAEMORSUM, Sw. (*A. furcatum*, Thunb.) Forked Spleenwort. (Fig. 5.) Vic.; N.S.W.; S.A.; W.A.; and all continents except Europe. Fronds are 6 to 18 inches high, with pinnae mostly $1\frac{1}{2}$ to 2 inches long, deeply notched, or even pinnate. The segments are wedge-shaped, notched at the end, prominently streaked with few diverging veins, and of a leathery texture. The sori are long and straight. This species appears to have been collected only at Darlot's Creek, near Portland (Allitt). The record for "Grampians" is probably a mistake, for Mueller erroneously records Darlot's Creek as in "Grampians District."

ASPENIUM HOOKERIANUM, Col. Maidenhair Spleenwort. (Fig. 6.) N.S.W.; N.Z. only. A small, tufted fern, rarely above 6 inches in height, with pinnae $\frac{1}{2}$ to 1 inch in length, consisting of 6 to 10 distinct, oblong-



I-VII ASPLENIUM

cuneate dentate segments rarely three lines in length. Sori usually 1 or 2 on each segment. Advanced fruiting specimens with the sori almost covering the segments somewhat resemble the larger forms of *Anogramma leptophylla*, which fact may have led to the record for "Colac Ranges," from which locality no specimen can be found in the National Herbarium. It is doubtful indeed whether it has ever been gathered in the State, as the record, "N.E. Upper Hume River," refers to New South Wales, as well as to Victoria.

ASPLENIUM OBTUSATUM, Forst. Shore Spleenwort. (Fig. 7.) N.S.W., Q., Tas., N.Z., all other continents. A remarkable sea coast fern, with fronds 6 inches to a foot in length, pinnate, and of a leathery texture. The pinnae are 2 or 3 inches in length, and up to 1 inch in breadth. This fern is common on the North Coast of Tasmania, and on the islands of Bass Strait, and may yet be found on the Victorian coast. As its record for Victoria depends on specimens gathered on the New South Wales coast north of Cape Howe, the name of this fern should be deleted from our Census.

ORCHID SECTION OF THE CLUB.

A meeting of those interested in the study of Victorian orchids was held in the National Herbarium on June 29th. It was resolved that an Orchid Section of the Victorian Field Naturalists' Club be formed, any person interested to be accepted as a member, such person to be nominated and seconded by a financial member of the Club; that the annual subscription (to cover expenses) be 2/6, to be paid to the Honorary Treasurer of the Club, and held for the use of and by the Orchid Section. It was decided further, that the Section meet at the National Herbarium on the first Wednesday of each month, the next meeting to take place on Wednesday, August 4th.

The aims of the Orchid Section, it was agreed, should be—(1) To partake in the intensive study and protection of Victorian Orchids; and (2) the diffusion of knowledge regarding them—in description and illustration.

A Sub-Committee of six members of the Club was elected, namely, Mr. E. E. Pescott (Chairman), Mrs. E. Coleman, Messrs. C. French, Jr., H. B. Williamson, W. H. Nicholls, and P. Morris (Secretary). This Sub-Committee has power to act in matters of jurisdiction, and will finalise the work of members of the Section. Officers will be elected annually.



THE SPANGLED DRONGO.

Recently, in the *Naturalist* (Vol. xliii., No. 3), mention was made of the Spangled Drongo, *Chibia bracteata*, and of its scarcity in Victoria. This curious bird has not only been seen and heard on many occasions, but has been nesting on Sperm Whale Head for several years. Five or six years ago, when walking through a clump of Coast tea-tree, *Leptospermum laevigatum*, on our property, I noticed a nest in the fork of a slanting branch, about 7 feet from the ground. The nest was composed chiefly of slender tea-tree twigs, and lined with bark and feathers; it contained three young birds, evidently hatched a few days previously, as they were still clad in very dark, almost black, down.

The parent birds were not present then, but half-an-hour later, one was seen on the nest; becoming aware of my presence, it was off in a flash. At the time I did not know that the Drongo existed in the locality, so could come to no conclusion as to the identity of the bird. Some three years later, in the same locality, I was attracted by some most unusual notes, but the singer was extremely shy, and not easily observed. Its favourite perch was the top twig of a dead *Banksia*, from which it uttered its own curious notes, and mimicked those of other species. While thus engaged, it paid very little attention to what was happening around it.

Eventually I obtained sufficient notes on the habits, color, etc., definitely to identify this bird as the Spangled Drongo. Since then I have become quite familiar with the species; and in 1924 I found a nest, containing five young birds. Both the nest and young were similar to those found several years before, and I feel certain that the Drongo was the bird that puzzled me then. Probably it has nested there every year. I have no doubt that Drongos migrate northwards in the autumn, and spend

the winter in New South Wales and Queensland, as I have noticed them here only during the spring and summer months. During the coming spring I hope to make fuller observations on their nesting and other habits.—FRED BARTON, Junr.

PLUMAGE OF BLUE WRENS.

Since John Gould wrote on the winter change of plumage of the Blue Wren (*Malurus cyaneus*), many other ornithologists have recorded their observations, confirming those of the great birdman. However, a close study of Blue Wrens, extending over many years, has convinced me that few, if any, of the males lose their bright plumage during winter. I have had ample opportunities of observing these birds in our garden at Ripponlea, to which a small party came more than five years ago. The male has retained his plumage every winter, and at no time of the year does the plumage lose its brightness. At present the other Wrens in the garden are dull-colored birds, one being a young male with blue tail feathers.

The short, thick scrub along Gardiner's Creek is a favorite haunt of Blue Wrens. Here several small parties have their homes, each being accompanied by a male in bright plumage. These males are to be seen in their usual dress throughout the year. In the early stages young males are similar to the females. The first male adornment is gained in winter, when the tail feathers become bright blue, then, in spring, the lovely blue livery is assumed.—D. DICKISON.

CARPET SNAKE'S MEAL.

In the Cairns district, Queensland, recently, I saw a Carpet Snake, *Python variegatus*, which had just swallowed a full-grown wallaby. The snake, with enormously distended abdomen, was unable to move its body from the "meal-point" backwards; but the front portion was active. The head was swinging round as if on a pivot. About five feet of the body was slender and sinuous; then came the bulky part, where the wallaby lay; beyond this barrier, normal snake again—the tail

was curled. Two Italians shot the poor reptile, whereupon it disgorged its meal. The wallaby was about 3 feet in height; its bones were broken, but otherwise it seemed to be uninjured. I was informed that carpet snakes sometimes attain a length of 20 feet or 21 feet.—C. BORCH.

"TWO RARE NATIVE MOUNTAIN HEATHS."

In the article under the above title, published in the *Naturalist* in April last, the geographical distribution of these two plants was described as strictly limited, growing only on the Baw Baws.

Mr. A. J. Tadgell now informs me that he had in his collection a specimen of *Wittsteinia vaccinacea*, collected by the late Charles Walter in the N.E. Alps. The specimen is now in the National Herbarium. That locality must therefore now be added for this plant.

Mr. Tadgell further states that he himself collected *Epacris Bawbawensis* also on the N.E. Alps, from the following mountains:—Buffalo, Feathertop, Hotham, Pilot, and Bogong. Thus also, the distribution of this Epacrid must be extended on our lists.

Mr. Tadgell is of the opinion, and this is confirmed by Mr. J. W. Audas, F.L.S., that this *Epacris* is synonymous with *E. paludosus*.—E. E. PEScott.

NEW SPECIES OF DRYOPIDAE.

In the *Proceedings of the Linnean Society of N.S.W.*, Part II., 1926, Mr. H. J. Carter deals with several species of beetles belonging to this family. The insects, until quite recently, were known as PARNIDAE, but an earlier generic name has been brought to light and so, according to the Law of Priority, the family name becomes DRYOPIDAE.

In 1864 the Rev. R. L. King named seven species from New South Wales; since that time the group has been almost wholly neglected by entomologists. Some species

of these beetles may be obtained in numbers; but owing to their mode of life, they are never found unless sought for specially. They pass their existence on submerged pieces of wood and stones, in streams, and, owing to the development of their claw-joints, which are very long, and furnished with two long, sharp-curved claws, they can retain their hold even in the rushing water. I have taken specimens from a piece of timber exposed to the full force of a small waterfall.

Recently Mr. Chas. Barrett and myself, in Victoria, and Mr. Carter and one or two other collectors, in New South Wales, have made a special point of searching for DRYOPIDAE, and the results have furnished most of the material for Mr. Carter's paper. All the new species, except one, belong to the genus *Helmis* (formerly *Elmis*). The Victorian representations are: *Nicholsoni*, from Ferntree Gully and Warburton, with a well marked variety, *bicolor*, from the upper reaches of the Dee, at Millgrove; *aerata*, a small species, also from Ferntree Gully; *angustata*, from Victoria, but exact locality uncertain; *quadriplagiata*, a very common beetle, from several localities near Melbourne; and *Wilsoni*, a tiny species, which I secured from beneath a large stone in the George River, at Lorne. Two other species are also described from New South Wales, and one, belonging to the genus *Hydrethus*, from Queensland.

All the known species have been found only in the eastern States and Tasmania, but possibly, if a close search were made, DRYOPIDAE might also be discovered in South and Western Australia. In October, 1925, when collecting near Port Augusta, S. Aust., I looked for DRYOPIDAE in a small permanent stream, but without success.

In addition to the new species described by Mr. Carter, one of the earlier named species, *Tasmanica*, Blackb., is also a fairly common beetle in our State; and at least one of King's species was described as coming from the Murray River.

As the collecting done by Mr. Barrett and myself has been mainly confined to streams not very far from Melbourne, it seems likely that other forms will be found when the more distant rivers and creeks have been carefully prospected for specimens.—F.E. WILSON.

"KEEPING" BIRDS.

Some so-called bird lovers may learn a lesson, if they will. I contrast two methods of "keeping" birds.

My neighbor for two years past, has kept a Rosella (*Platycerus eximius*) in an enclosure, some six feet square; and, I do not doubt, he considers that the bird has its liberty. Why he keeps it I have long wondered, as it does not give him even the proverbial "Pretty Joey." When he does not forget the bird, he calls to it, and it responds to his whistle with "pea wee." Mostly the bird passes its time in solitude and semi-darkness, as part of the cage for about half the height from the top is boarded down, for protection against bad weather and for shade in summer. Pointing to an English thrush, brimming over with melody, that we see on the topmost branch of an adjoining gum tree, or to a Grey Thrush (*Colluricincla harmonica*), in the tea-tree near by, I say: "How can a bird be kept in captivity and so made unhappy?"

Now for the other side of the picture. Some people near Wandin "keep" a young Major Mitchell Cockatoo (*Cacatua leadbeateri*), which was sent them from the Mallee. The bird has always had his liberty, is happy, and keeps about his new home. At night he retires to a tree, *Eucalyptus macrorhyncha*, close to the house, and calls in for his breakfast of warm, steeped biscuit, each morning. He has a preference for arrowroot biscuit, but if given a currant luncheon, carefully rejects each currant. On a recent week-end visit, we had walked a quarter of a mile from the house, when the cockatoo flew over our heads, displaying his beautiful salmon-colored crest, underwings, and breast feathers. He greeted us with "Hullo. Cocky, what!" I placed a piece of apple at my feet and as I bent down, the bird flew on to my back. Watching till I was ready, he dropped lightly to the ground. Carefully he peeled the piece of apple and left the rind. As we continued our walk, he flew round us and followed, or alighted on the post-and-wire fence, generally keeping a foot or two in advance of us, talking the while. When we were half a mile from home, he flew away.

Magpies are a cause of annoyance to the cockatoo, they pursue him at times.—A.J.T.

THE SWISS NATIONAL PARK.

One cannot but admire the exceedingly live interest taken in Switzerland, in the preservation of the scenery, fauna and flora of that country. No land is now immune from the ravages by the exploiter of animal or plant life for purposes of commerce, and when that is the collector's uppermost thought, what cares he for the scientific value or aesthetic influence of the beauties of Nature. In a young country like Australia, it is imperative that we, as naturalists, keep our eyes alert to detect any signs of spoliation of our natural beauty spots which, once lost, can hardly ever be regained. And this watchfulness over Victorian natural treasures, has in the past, been always faithfully kept by the Field Naturalists' Club. In Switzerland, there is a "League for the Protection of Nature." It has nearly 30,000 members, paying an annual sum of 2 francs, or 50 francs for a life-membership. This and other details we learn from the Hooker Lecture on the Swiss National Park, given before the Linnean Society of London by Professor Carl Schroeter.

In the précis of the lecture given in the Proceedings of that Society we are told that:—"The result up to now has been the protection of a number of mountains from invasion by railways, the preservation of 400 erratic blocks, 50 trees of special beauty, 15 fens, 20 bird sanctuaries, and districts where shooting is prohibited." Among the rules enforced in this ideal National Park are the following:—"Shooting, fishing, manuring, grazing, mowing and wood-cutting are entirely forbidden." To carry out the next rule one would have to exclude collecting botanists, for "No flower or twig may be gathered." No stones may be removed (is it not almost time to exclude geologists from Werribee Gorge?), "and even fallen trees must remain untouched." The general arrangements provide for huts "but no hotels." Camping and lighting fires are prohibited. The favourable effects of the preservation of this area are seen in the increase of the number of animals during seven years. The idea of a league of membership of this kind might be advocated for Victoria, if only to create a personal interest amongst the people of this State in the natural objects and treasures of their own land.—F. CHAPMAN.

NORTH QUEENSLAND SWALLOWTAILS.

BY C. BORCH.

Papilio ulysses and *Troides euphorion* are the most beautiful of Australian butterflies. In North Queensland recently I saw both species on the wing—a pleasure long anticipated.

The elegant Blue Swallowtail, *P. ulysses*, is moderately plentiful during some months, and has been taken in every month of the year. I found it to be most abundant in January, February, and March. Often it is called "Blue Mountain" butterfly by residents of the Cairns district. One or two of these splendid insects, fluttering about brilliant Lantana flowers, their wings flashing in the sunlight, and glowing in shade, is a sight to quicken the pulse of any nature lover. *Ulysses* often visits gardens near the scrubs.

Larvæ of the Blue Swallowtail were found on a scrub tree with bright green stems and large, oval-shaped, light-green leaves. Many of the trees were tall, but the caterpillars always were taken on small specimens—about 12 feet in height. The larva of *P. ulysses* is rather handsome, and has dorsal spines, which are lost in the last moult. Light-green and white are the prevailing colours in the final instar, when the larva is decidedly like that of *P. sarpedon*.

Usually these caterpillars are found singly, or two on a plant. Each spins webbing on the upper portion of a leaf, where, apparently, it resides, only coming forth for food. The pupa is of a light-green colour, and is attached to the under-surface of a leaf, or a twig, of the food-plant. It is difficult to detect.

The Birdwing Butterfly, *T. euphorion*, our representative of the ornithopteras, although a beautiful insect in the cabinet, is a little disappointing, seen on the wing. Rarely does one get glimpses of the splendid colours, as the Birdwing wheels in sunshine. It flies rather slowly, with flapping motion, in marked contrast to the swift, alert flight of *P. ulysses*.

In company with Mr. A. Burns, a Queensland member of our Club, and an ardent collector, I searched for larvae and pupae of the Birdwing Butterfly. We discovered about 40 caterpillars and seven pupae. Our hunting-ground was on the Mulgrave River, 15 miles south of Cairns. The soil was sandy, and the vegetation, consequently, not so dense as in other scrubland areas, where the growth was too dense to be penetrated. The larvae of *Triodes* is a repulsive looking creature, dark, brownish-black (or some dark colour, for individuals vary a good deal), covered in fleshy black spines on the back and sides; when touched it projects two red tentacles behind the head (as do all Papilio larvae that I have seen), and emits an offensive odour. The food-plant is a species of *Aristolochia*, a climber which covers small shrubs, tree-trunks, etc.

The larvae of *Triodes* are, apparently, great wanderers from "home." We saw one on a "foreign" plant, but could not discover the food. One or two specimens, usually, are seen on a plant. The pupa, invariably, is attached to the under-surface of a leaf, either near, or at some distance from, the food plant.

I stayed for several weeks at the home of Mr. and Mrs. Burns, and it is owing to their kindness that many of my specimens were secured. We spent many happy days insect-hunting in the scrub.

[On Dunk Island butterflies abound, and there I saw dozens of Swallowtails, *Ulysses*, and the Birdwing. One of the finest prose passages in Australian literature is the late Mr. E. J. Banfield's description of the love-flight of *Ulysses*, a species that was first observed, in Australia, on Dunk Island, more than fifty years ago. The love-making of the green and gold and black *Ornithoptera*, that "gem" among Queensland butterflies, has also been finely described by "The Beachcomber." Butterfly wings gleam on many pages of his books.—C.B.]

NOTES ON A SPIDER.

An American writer states: "We are so ignorant of the intricacies of entomology that we can learn much by a study of the common things at our very doors." On February 22 I observed, on a small branch of a plum tree in my garden, eight globular egg-cases, of the texture of paper, each nearly half an inch in diameter, light brown in color, with umber markings crossing each other irregularly, or splashed on here and there as casually as the markings on a Chinese lottery ticket. There were two groups of three and of five cases respectively, all strung together by web, and ingeniously attached to the branch by threads or strands of web, which securely held them in place.

I counted nine cases subsequently, and spread out on two, so as to appear amorphous in character, was the mother spider (*Selena excavata*), immovable, and apparently oblivious of her surroundings.

The thorax, head and legs were black, the back a whitish or greyish splotch, the whole attitude and color scheme evidently an instance of protective adaptation in imitation of the dropping of a bird.

The spider was abnormally swollen in the abdomen, although seeming to take no nourishment. It remained in the same cramped position, apparently, for days, occasionally changing over to different egg-cases, to which it attached itself persistently, or else retreating to the lower side in extreme heat. For a fortnight there was no change, except that in the upper case appeared a small puncture, the other cases being intact.

Was this continued brooding simply to protect the cases during the process of incubation, or did it also assist in the same? Was the striped marking a means of recognition, or a further protective device? These questions suggested themselves; and also I wondered whether the spider would be able to assume the care of such a prospectively numerous progeny, or would after her apparently self-inflicted hunger strike, ease her parental task by devouring the weaklings among her offspring as she had probably done with her mate.

Frequent visits for observation showed no alteration for nearly two weeks, until, on March 10, another case was added, making 10 in all. The case was placed in position during the night, without any preliminary preparation. Observing the spider at night, on March 12, I found her set position relaxed, and the legs extended. A

large moth was suspended at one side; of this, in the morning, there was not a vestige. Next day a number of young spiders, like specks of wool, were seen dropping from the upper case on invisible threads. Again on the night of the 14th, the spider was in an easy position and had another large moth for the larder hung up like a carcase in a butcher's shop. This moth had also completely disappeared in the morning. It was evident that the spider seized its prey at night, perhaps stalking it, as no web is made for entrapping insects.

Another egg-case joined the family circle on the 19th. A few days later another batch of little spiders made parachute flights; and at night again, a moth had been captured. On the 23rd the spider had disappeared, and I thought that a sharp-eyed sparrow had detected the camouflage; but on the following morning it was in its usual place and attitude.

On March 28 the 12th egg-case appeared, and a month later, April 30, the total was 13. This last brown ball was slightly smaller than the others, and it appeared that Selena was tiring of the game. Six cases were now perforated, but she clung as closely and constantly as ever to the others. Once again some animated specks of wool disappeared into space, and another month passed without any variation to break the monotony of the patient waiting and watching.

On June 9 the spider was on duty, but next day her place knew her no more, nor has she reappeared. Except for one noticeable absence, she had by day immovably maintained her place on the egg-cases for about four months under observation, and probably for three months before the first date mentioned.—C.D.

THE LADIES' COMMITTEE.

The great success of our Wild Flower Shows has been very largely due to the excellent work done by our lady members and friends, who have given so freely of their time and services to crown our Show efforts. I would ask again the hearty co-operation of all our Lady workers in making this Show the best we have ever had. Would all of those who can make it at all possible, kindly attend the next meeting, so that all arrangements necessary can be made to carry out the Ladies' programme?

The Secretary will be glad to hear of help from any Lady who finds herself unable to attend the meeting.—
THE PRESIDENT.

Field Naturalists' Club of Victoria

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C. OKE.

EXCURSIONS.

SATURDAY, AUGUST 21.—Black Rock. Object: Botany.
Leader: Mr. H. B. Williamson, F.L.S. Meet at Flinders
Street Station, 2 p.m. Dr. Shuter will meet and entertain
members on arrival at Black Rock.

SATURDAY, AUGUST 28.—Geelong. Object: Geology. Leader:
Mr. J. M. Wilson. Meet at Spencer Street Station at 6.30
a.m.

SATURDAY, SEPTEMBER 4.—Cheltenham. Object: Pond Life.
Leader: Mr. J. Wilcox. Meet at Flinders Street Station in
time for 1.30 p.m. train.

SATURDAY, SEPTEMBER 11.—Sherbrook Gully. Object:
General. Leader: Mr. E. E. Pescott, F.L.S. Meet at Flinders
Street in time for 9.10 a.m. to Belgrave. Lunch to be taken.
The Leader will meet members travelling by the 12.48 p.m.
train from Flinders Street to Belgrave, at the Sherbrook
Gully Kiosk.

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SEPTEMBER, 1926.



The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 7th September, 1926

Hon. Editor: CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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1926

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 13th SEPTEMBER, 1926.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBERS:	PROPOSER:	SECONDER:
Miss A. Butler, Alexandra Avenue, Windsor.	Mr. L. L. Hodgson	Mr. C. French, Jr.
Mrs. T. H. Sarovich, Whitehorse Road, Surrey Hills.	Mr. F.B.Sutherland	Mr. L. L. Hodgson
Miss D. Ross, Church of Eng. Girls' Grammar School, South Yarra.	Mr. C. Barrett	Mr. L. L. Hodgson
Miss E. Colebrook, Church of Eng. Girls' Grammar School, South Yarra.	Mr. C. Barrett	Mr. L. L. Hodgson
Miss A. Paterson, 275 Bay Street, Port Melbourne.	Mr. V. Miller	Mr. H. P. Dickens
Mr. W. Ramm, 654 Station Street, North Carlton.	Mr. J. Searle.	Mr. J. Wilcox

AS ASSOCIATE MEMBERS:

Mr. Eric Haslem, Bluff Road, Sandringham.	Mr. G. Coghill	Mr. L. L. Hodgson
Mr. Andrew Taylor, Estella Street, Glen Iris.	Mr. L. L. Hodgson	Mr. E. E. Pescott

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Please remember that notes are required for the "Naturalist."

6. Reading of Papers and Discussion thereof.

1. By Mr. C. Daley, B.A., F.L.S.—"Some Notes from a Diary of Allan Cunningham."

2. By Mr. A. E. Rodda.—"Around the Yan Yean."

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a brief description thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

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SEPTEMBER 7, 1926.

No. 513.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall, Victoria Street, on Monday evening, August 9th, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 70 members and friends were present.

CORRESPONDENCE.

From Mr. F. Lewis, Chief Inspector of Fisheries and Game, stating that he was giving attention to the matter of Sherbrooke Gully and Forest, with a view to the area being proclaimed a Sanctuary.

From Department of Lands and Survey, stating that the Club's request that the "Dandenong Police Paddock" be reserved as a Public Park had been recorded.

From Combined Progress Associations of the Shire of Fern Tree Gully, inviting the President to attend a Conference in regard to Sherbrooke Gully at Belgrave on September 18th.

It was resolved that the President should represent the Club at the Conference.

REPORTS.

A report on the visit to the National Museum on July 24th was given by Mr. C. Lambert.

ELECTION OF MEMBERS.

On a ballot being taken, the following were elected as ordinary members:—Mr. Geo. Hawkins, Winmallee Road, Balwyn; Mr. M. J. Woodhouse, 34 Andrew Street, Windsor; Miss I. Wilkinson, Police Department, Melbourne; Miss M. Carlile, Town Hall, Melbourne; Miss A. Malesky, Vauxhall Road, Canterbury; and Misses E. L. and H. O. Kearthland, 66 Gipps Street, East Melbourne.

GENERAL.

The Hon. Secretary read the minutes of the monthly meeting of the Orchid Section of the Club, held at the Herbarium on August 4th.

Mr. F. Pitcher moved that in view of the Club's

decision to donate part of the proceeds of the Wild Flower Show to the Children's Hospital Appeal, the Hospital be asked to co-operate in obtaining supplies of flowers, and rendering assistance at the Show. Miss Gabriel seconded the motion, which was carried.

PAPERS.

A New Victorian Orchid, by Mr. W. H. Nicholls. This paper was read by the President, who referred to the valuable work Mr. Nicholls had done on these plants.

Rambles in the Lorne District, by Mr. L. L. Hodgson. The paper was illustrated by lantern slides.

EXHIBITS.

By Mrs. E. Coleman: Growing plant of *Dendrobium aemulum* (R.Br.), "White Feather Orchid," showing nine healthy racemes. This orchid flowers in September, and grows on trunks of lofty ironbarks, red box, or on sassafras trees, in mountain gullies. (Collected by Rev. H. R. M. Rupp, on Hungry Mt., N.S.W., 21/16/1926).

By Mr. F. Chapman: Specimen of *Acacia longifolia*, Sallow Wattle, cultivated at Balwyn.

By Mr. H. P. McColl: Specimens of cultivated native flowers.

By Mr. J. Searle: Two small colonies of *Termites* (2 species) from the Mallee.

By Mr. E. E. Pescott, F.L.S.: Cultivated specimen of Bushy Heath Myrtle, *Thryptomene ciliatus*, Stapf, (*Mitchelliana*, F.v.M.).

By Mr. H. P. Dickens: Coloured drawing of group of orchids.

By Mr. L. L. Hodgson (on behalf of Mr. C. W.D'Alton, Hall's Gap): Chip found inside an old stringy-bark tree in the Grampians. The following note by Mr. D'Alton was read:—

"The old axe marks were first noticed after cutting through six inches of solid red timber on a large tree growing near the edge of a water course. Experienced bushmen declare that the cutting must have taken place at least 80 or 90 years ago. As this would be near the route taken by Major Mitchell while travelling from old Pleasant Creek to Mt. William, it is quite possible that some members of the party of explorers camped on the bank of this water-course."

RAMBLES IN THE LORNE DISTRICT.

BY L. L. HODGSON.

(Read before the *Field Naturalists' Club of Victoria*,
August 9th, 1926.)

In December, 1925, I spent a short vacation at Eastern View, in the Lorne district, the locality being reached by way of the Great Ocean Road. The country passed through between Geelong and Anglesea presents few features of outstanding interest. Shortly after leaving the township, a long, narrow spit of land, or low sandstone cliff, is seen, running out in a curve for some distance to sea, and forming a charming little bay. Looking back towards Anglesea from this point, the sheer sandstone cliffs, which show evidence of erosion due to wave action, are a striking feature. A few miles further on, the road winds through a large clump of Red Ironbarks (*Eucalyptus sideroxylon*), Grass-trees (*Xanthorrhœa australis*) here make their appearance and continue, as a distinctive feature of the vegetation, for some miles.

Some distance beyond Airey's Inlet, Mogg's Creek with its Tea-tree fringed banks, is crossed, and, after following the sea-shore for about two miles, Eastern View is reached, whence a fine sandy beach extends the whole distance to Airey's Inlet, four miles eastward. A narrow belt of Tea-tree (*Leptospermum lævigatum*) separates the beach from the hills, which rise sharply to the north of the road, and are covered with a dense growth of stunted Eucalypts, from 6 ft. to 10 ft. in height, forming an almost impenetrable barrier. An interesting feature of the sea-shore at Eastern View, is a reef of brown coal, which is exposed at low tide, and indicates the existence of a carboniferous area.

Just beyond Eastern View, the road has been cut out of the face of a hill, which drops steeply to the beach, and on the far side of which is a sharp hairpin bend, known as the Devil's Elbow, where the road turns inland, hugging the side of the hill above Grassy Creek. After crossing this creek, the climb up the slopes of Big Hill is commenced, a height of 300 feet above sea level being soon attained. On the seaward side, the cliff falls precipitously to the rocks below, over which the rollers break ominously at high tide, there being no beach at this point. Some splendid panoramic views of the coast towards Lorne are obtained while traversing the road

under the brow of Big Hill, for the next two miles. Another dry creek-bed is crossed, and a series of hairpin bends negotiated, before the road runs on an easy grade to Lorne.

The country surrounding Eastern View affords opportunities for several interesting trips, the most important being that up the valley of Grassy Creek to the Louise Falls. This stream meanders through very hilly forest country, the timber consisting principally of Blue-gum (*Eucalyptus globulus*), Messmate (*E. obliqua*), and Manna-gum (*E. viminalis*), with a sprinkling of Red Ironbarks (*E. sideroxylon*). The track follows the course of the creek fairly closely, at times rising sharply over a spur to avoid a detour, and often descending to the creek-bed, which is crossed and recrossed at frequent intervals. After traversing some three miles in this manner, a somewhat longer climb than usual brings one to a position on a steep slope overlooking a small gorge, known as McCormack's Canyon. The bed of the creek is seen 150 feet below, and on one side a perpendicular cliff rises to a height of perhaps 80 feet, while on the opposite bank many tree-ferns flourish in the damp soil. The track continues along the side of the hill for some distance, and a glimpse is obtained of the lower falls which, however, are hardly worth the effort entailed in scrambling down through the rough undergrowth to obtain a closer view. A few hundred yards above these falls, a descent is again made to the creek, at a spot which provides ample facilities for camping purposes.

Following the somewhat ill-defined track for another mile or two, the entrance to Herschel's Fernery is reached, and a sharp descent brings one into the midst of a mass of magnificent Soft Tree-ferns (*Dicksonia antarctica*) luxuriating in the moist conditions which here prevail. These ferns grow in great profusion for a mile along the banks of the stream, the track winding in and out among their trunks, on which many lesser ferns, such as Maiden-hair (*Adiantum aethiopicum*), Kangaroo Fern (*Polypodium diversifolium*) and Spleenwort (*Asplenium*) find a congenial root-hold, in association with various mosses. The water's edge is also fringed with many water-ferns (*Blechnum capense*), and the scene is one of great beauty. This locality is not, as yet, well-known, and has consequently not suffered from the depredations of the selfish and thoughtless tourists, who appear to delight in uprooting and carrying off these beautiful plants.

At the farther end of the Fernery, the track suddenly

terminates at the foot of a 50 ft. cliff, over which the water dashes and falls in a shower of spray into a large pool, before it ripples away over its stony bed to the sea. The cliff-face is not perpendicular, but curves inwards, and thus forms a cave behind the falls. It consists of a sandstone formation, the layers of which can be easily dislodged, and a little diligence and keen observation may be rewarded by the finding of specimens bearing leaf impressions of the Jurassic era. A tree was observed at this spot, bearing some initials, and a date in the early Eighties; but the ravages of time had partly obliterated the lettering, making it very difficult to decipher.

Little of outstanding interest from a botanical point of view was observed at the time this trip was undertaken, but the following plants were noted:—Austral Mulberry (*Hedycarya angustifolia*), Musk Daisy-bush (*Olearia argophylla*), Christmas-bush (*Prostanthera lasianthos*), Tough Riceflower (*Pimelea axiflora*), Derwent Speedwell (*Veronica Derwentia*), Hazel (*Pomaderris apetala*), Golden Tip (*Goodia latifolia*), Hop Goodenia (*Goodenia ovata*), Blanket-leaf (*Bedfordia salicina*), Kangaroo Apple (*Solanum aviculare*), in addition to a few isolated specimens of the Blue Pincushion (*Brunonia australis*). Birds were very scarce, but a flock of Black Cockatoos (*Calyptrorhynchus funereus*) was observed feeding in the tree-tops, to the accompaniment of much screeching.

Another interesting, but shorter, trip is that to Shelly Beach, under Big Hill. This is reached by a steep zig-zag track leading down from the Ocean Road, on the Lorne side of the Hill, and a few hours might be profitably spent in sifting through the heaps of perfect and broken shells which litter the narrow strip of sand. Cowries and many other small shells may be found here in profusion.

The return to Eastern View may be varied at low tide by keeping close under the lee of Big Hill and scrambling over the masses of rocks, which are a feature of the coast. These rocks are of a sandstone formation, and many small, hard knobs appear as excrescences on their surfaces, the softer portions having been gradually worn away by the action of the elements. At short intervals, the force of the waves has scooped deep gulches or fissures in the solid rock, up which the rollers dash with great violence, and effectually prevent progress at high tide. A large cave, which penetrates the foot of Big Hill for about 50 ft. hereabouts, is of interest.

Good fishing is obtainable off the rocks in this vicinity, a fish known locally as Rockies, being fairly plentiful and easily caught; the flesh is somewhat soft, but good eating. Other fishes found in these waters are Sweep, Schnapper, "Bluenose," Salmon Trout and Flounders. The two latter varieties, however, prefer the sandy beaches to the rocks, and are usually caught with the aid of a drag-net when weather and tidal conditions are favourable. Porpoises sometimes visit these shores, and a number was, on one occasion, observed disporting close in-shore; they appeared to perform a series of strange evolutions, now the head and then the tail showing above the surface of the water.

In addition to the coastal road, there is a route around the back of Big Hill, which has been formed by widening the old bridle-track to Lorne, and which rejoins the Ocean Road near a small creek-bed on the far side. The only feature of particular interest along this back track is a number of Ironbarks, which form a fine natural avenue.

One of the finest coastal walks in the district is that to the Cumberland River, some five miles to the west of Lorne. The bridle track has been cut on an easy grade, well above high tide level, and, in rough weather, heavy seas break on the rocky coast below. The first section of the track, about a mile in length, follows a timber tram-line as far as the St. George River, a fair sized stream at its mouth. The western slope of Teddy's Lookout, on which is a zig-zag foot-track, drops steeply down to the river, while on the opposite side of the valley, the eastern declivity of Mt. St. George rises abruptly to the summit, 650 feet above sea level. Crossing the St. George River on a substantial foot-bridge, the track skirts the Mount for some two miles, when a break in the hills indicates a watercourse; this proves to be the Sheoak River, a much smaller stream than the St. George, and is crossed by means of stepping stones. Some distance up this creek are the Swallow Caves, in which are a great number of nests.

Pushing on round the slopes of "The Brothers," two hills of similar appearance, in close proximity, the track shortly descends to the left bank of the Cumberland River. This is also a smaller stream than the St. George, averaging 8 feet to 10 feet in width, except at its mouth, where it widens considerably. The scene looking up the Cumberland Valley is one of grandeur, suggestive of parts of the Grampians. On the right hand, rugged cliffs mount perpendicularly to a height of 100 feet, from

the top of which a steep slope leads to the foot of another precipitous wall of rock rising to the peak "Scaw Fell." To the left, the rugged slopes of Langdale Pike ascend to a sharp rock-crowned point, whilst between these two eminences, the river ripples and gurgles over its boulder-strewn bed.

Perhaps the most favoured inland trip in the Lorne district is that up the Erskine River to the Erskine Falls. This river runs into the sea on the eastern outskirts of the township, and makes a picturesque scene, with its rows of big Eucalypts growing on either bank, and spreading their branches over the waters. A short distance upstream, a wide, shelving mass of dark rock intrudes across the river bed, over which the water rushes impetuously, forming "The Rapids." A well-worn foot-track closely follows the course of the stream, which is crossed frequently, stepping-stones marking the way. Altogether, 29 crossings were counted in the course of the six miles between the starting point and the Falls. The sloping banks are, for the most part, well clothed with varied vegetation, including tree-ferns, interspersed with many Eucalypts (principally *E. viminalis*) and Blackwoods (*Acacia melanoxylon*), some of which grow at the water's edge, their branches forming a canopy, shading the fern-fringed pools. At intervals, rocky cliff-faces rise sheer from the water, proving an insurmountable obstacle to the rivers' progress, and compelling it to seek an outlet in another direction.

On approaching closer to the Falls, the tree-ferns increase noticeably in size and number, their stems being often covered with Kangaroo Fern, and various mosses. A less happy note is struck by the masses of uprooted tree trunks, logs, and other debris, which, here and there, piled high in midstream, bear testimony to the devastating effects of the violent floods of recent years. The course of the stream has, in some instances, been diverted into fresh channels by these obstructions; in one place the river has branched, leaving an island between the two arms, on which several fair-sized trees are thriving. A mile or so below the Erskine Falls, Splitters Creek joins the main stream, and, by a deviation of a few hundred yards, a good view of Splitter's Falls may be obtained. These Falls are not very impressive, as they consist of a series of long narrow bands of water dropping from rocky ledge to ledge, until they are lost under the rubbish with which the stream bed is strewn.

Returning to the Erskine, the track, which is in places obliterated by piled-up driftwood, necessitating a

scramble or a detour to make progress, leads to the camping ground, a beautiful bower among the tree-ferns. Here the alternative route from Lorne, via the upper road, junctions with the river track. A half-mile further on, Straw Falls, little more than a trickle over a bare face of rock to the right, are passed, and very soon, the famous Erskine Falls come into view. Seen through the over-hanging foliage, the falling water, glistening in the sunlight, makes a charming picture in its setting of innumerable small ferns and mosses, which cling to the crevices in the cliff-face, and flourish in the constant spray. Much of the primeval beauty of the surroundings has, however, evidently been destroyed by the numerous sightseers, who annually visit this locality. While we were there, one woman was observed carrying off an armful of ferns which, despite the regulations prohibiting their removal, she had ruthlessly uprooted in the vicinity.

Owing to the time of year, only a limited number of plants were found in bloom. The flora is not in such variety as is found in some parts of the State, but the ferns and mosses are equal in luxuriance and profusion to those of other notable localities. The description of the vegetation met with on Grassy Creek and the Erskine River applies generally to the forest country inland.

On the sea-front, specimens of the Cushion Bush (*Calocephalus Brownii*), Sea Box (*Gynopogon buxifolius*), Coast Beard Heath (*Leucopogon Richei*), Coastal Tea-tree (*Leptospermum lævigatum*), Clustered Everlasting (*Helichrysum semi-papposum*) and other species of the last-named genus were collected. The scarcity of bird and animal life during our stay was very noticeable; an occasional Magpie (*Gymnorhina tibicen*), some Kookaburras (*Dacelo gigas*), and a few Parrots—mostly Rosellas (*Platycerus eximius*) and Red Lories (*Platycerus elegans*)—comprised the principal representatives of the feathered world. Blue Wrens (*Malurus cyaneus*), both male and female, were also in evidence, a number of these dainty little creatures frequenting the garden and picking up the odd crumbs thrown out for them.

No native mammals were seen, although Wallabies and Koalas are said to be found in the inland forest; but rabbits are present in such numbers that the settlers are forced to use wire-netting in order to protect their paddocks and cultivated fields from the depredations of these pests.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

Part I.

DISTRIBUTION.

In the distribution of Australian Orchids, the State of Victoria may be considered to be well favored by nature. Possessing, as it does, a purely temperate climate, with a good rainfall, it is naturally a country where terrestrial orchids may occur in abundance.

Dr. R. S. Rogers has estimated that an annual ten-inch rainfall is necessary for proper growth and development of orchids. As there is practically no area in Victoria where the rainfall is so low, we may expect to find these plants in every district.

While Victoria is the second smallest State in the Commonwealth, it occupies third place of pride in the number of species of orchids, there being 137 recorded for the State. Queensland and New South Wales enjoy tropical conditions, as well as temperate, and so their numbers are greater, 209 and 177 species respectively. Western Australia follows Victoria, with 118; South Australia has 98; Tasmania, 82, and Northern Territory 22 species.

Many of these species, however, occur in more than one State, so that the study of orchids of one State would necessarily include those of other States. About 450 species have been recorded for Australia.

In Australia, the orchid family is represented by 64 genera, of which nine or ten are purely endemic. Victoria has recorded 25 genera, six of these being purely Australian types, namely *Diuris*, *Spiculoea*, *Eriochilus*, *Burnettia*, *Leptoceras*, and *Glossodia*.

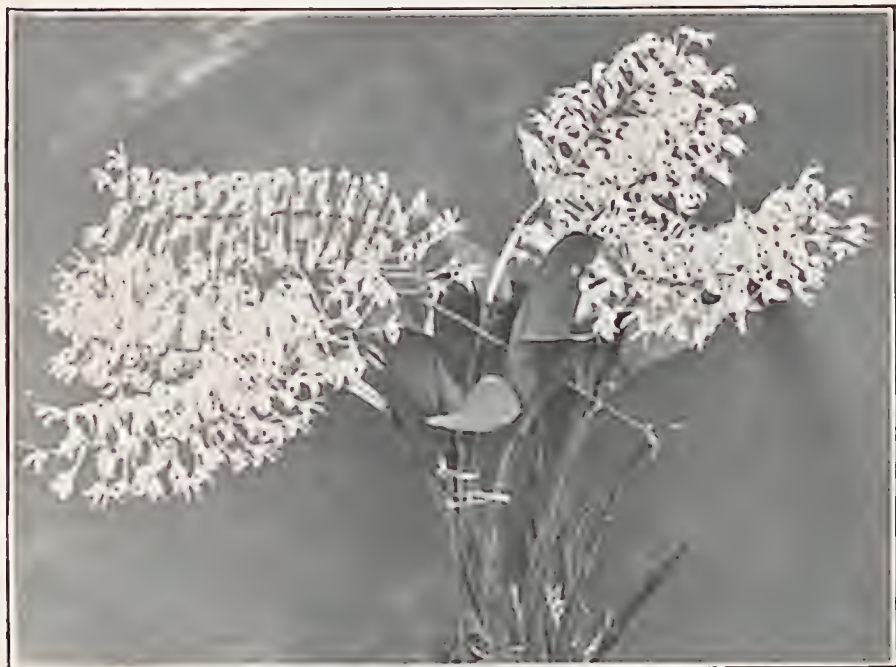
Complete surveys of orchids have not yet been made in Victoria. While the orchid flora of the mountains, centre, north-east and south-east is fairly well recorded, very little exploration work has been carried out in the Mallee, and in the extreme western areas. Naturally, far more is known of the orchids within 50 miles of Melbourne, than elsewhere.

LITERATURE.

Fitzgerald's *Australian Orchids*, a large and costly work, is the classic of Australian Orchideae, and it may be consulted at our Public Library. The life-size coloured drawings and diagnoses are very clear and good.

The following articles on Orchids have appeared in the *Victorian Naturalist*:—

- (1) *The Orchideae of Victoria*.—A series of articles by Charles French, Senr., in the following numbers:—1884, Vol. I., Nos. 1, 3, 6, 7, 11, 12; 1885, Vol. II., Nos. 4, 11; 1886, Vol. III., Nos. 5, 6; 1887, Vol. IV., Nos. 1, 4.
- (2) *Observations on the Flowering Times and Habitats of Some Victorian Orchids*, by Charles French, Jr., July, 1895, Vol. XII.
- (3) *List of Orchids Collected Near Sale*, by May and Lilian Wise, and Muriel Bennett, July, 1895, Vol. XII.
- (4) *Additional Localities for Victorian Orchids*, by T. S. Hart, M.A., Aug., 1895, Vol. XII.
- (5) *A Westralian Form of the Orchid Prasophyllum Australe*, by Oswald H. Sargent, September, 1913, Vol. XXX.
- (6) *A Year Among the Orchids: a Reminiscence*, by E. E. Pescott and C. French, Jr., September, 1916, Vol. XXXII.
- (7) *Notes on the Reproduction of Terrestrial Orchids*, by E. E. Pescott, February and March, 1918, Vol. XXXIV.
- (8) *Notes on the Orchids of Victoria, Part I.*, by E. E. Pescott, January, 1921, Vol. XXXVII.
- (9) *On Four Orchids, New for Victoria*, by E. E. Pescott and C. French, Jr., January, 1921, Vol. XXXVII., Pl.
- (10) *The Blotched Sun Orchid*, by E. E. Pescott, January, 1921, Vol. XXXVII.
- (11) *Notes on the Orchids of Victoria, Part II.*, by E. E. Pescott, January, 1924, Vol. XL., Pl.
- (12) *Thirty Years Orchid Collecting*, by E. E. Pescott and C. French, Jr., April, 1925, Vol. XLI., Pl.
- (13) *Two Autumn Greenhoods*, by E. E. Pescott, July, 1925, Vol. XLII., Pl.
- (14) *The "Rufa" Group of Greenhoods*, by A. J. Tadgell, October, 1925, Vol. XLII., Pl.
- (15) *The Propagation of Our Pterostylis*, by W. H. Nicholls, December, 1925, Vol. XLII., Pl.
- (16) *Notes on the Genus Corysanthes*, by Rev. H. M. R. Rupp, May, 1926, Vol. XLIII.
- (17) *The Greenhood Orchids of Victoria*, by W. H. Nicholls, July and August, 1926, Vol. XLIII., Pl. (2).



DENDROBIUM SPECIOSUM, Small Rock Orchid.



LABELLA OF VARIOUS ORCHIDS.
(see page 144 for detailed description.)

Records of new species recorded in the *Naturalist*, are as follow:—

Pterostylis Mackibbini—F. v. Mueller, October, 1892.

Prasophyllum Dixoni—F. v. Mueller, June, July, 1892.

Prasophyllum Frenchi—F. v. Mueller, June, July, 1892.

Drakaea Huntiana—F. v. Mueller, April, 1899.

Prasophyllum fusco-viride—F. M. Reader, February, 1898.

Diuris punctata, var. *D'Altoni*—C. Walter, March, 1907.

WHAT IS AN ORCHID?

Briefly, there are two features present in the flower which differentiate an orchid from every other flower. The first is the labellum, or lip. An orchid flower has six perianth segments, or divisions, three sepals, two petals, and the labellum. That is, in the orchid flower, one petal has developed differently from the other two, the development being usually remarkable. In orchids the labellum is variously like a pouch, a claw, a mass of hairs—it is often grotesque and frequently very beautiful.

In many orchids, the labellum is the conspicuous and beautiful part of the flower.

The second feature is known as the column. This organ usually stands in the centre of the flower, forming a combination, or a union of the stamens, style and stigma into one organ. The column can clearly be seen in any orchid, and in the illustrations given.

In one genus of orchids, *Thelymitra*, the unusual appearance of the lip is not present, the flower appearing almost regular, except that the lowest "petal," which is really the labellum, is often somewhat larger and more vigorous in form than the other two.

GROUPS.

According to their habit of growth and their methods of obtaining sustenance, orchids are classed into two groups. The first group includes those that grow upon trees, the *Epiphytes*. They are not parasites. This class of plant, in growing upon trees, also derives nourishment from the sap of the trees. But the epiphytes merely cling to and grow upon the trees, using them as a means of support, obtaining nourishment and moisture from the air and from rain. There are four epiphytes, and possibly five, recorded among Victorian orchids.

The second group is classed as *Terrestrial*, and includes by far the greater number of local species, 133 in all.

REPRODUCTION.

The production of seed in orchids is very considerable. Many thousands are contained in one seed-vessel. There must thus be a vast loss of energy, for few seedlings have ever been observed. Epiphytes, not having tubers, must of necessity increase by seed. Very few of the seeds produced ever grow, for these plants, in Victoria at least, have always been rare. To grow, the seeds would require to find lodgment on the bark of trees, or in rock crevices. Many would be lost by wind and water dispersal.

That seedlings of terrestrial orchids have been found is well known. The excellent article by W. H. Nichols (15) illustrates this: and there is no doubt that, where single specimens are found, they must necessarily have their origin from seed.

Where plants are found in clusters or colonies, their reproduction is certainly the result of increase by tubers. This has been fully demonstrated in a paper in the *Victorian Naturalist* (7). But little is known in regard to either aspect of the question, and here is a wide field worthy of serious investigation.

CLASSIFICATION.

ORCHIDACEAE.

TRIBE 1.—MALAXIDEAE:—Another lid-like incumbent, usually deciduous. Pollen masses waxy, two, four or rarely eight, without caudicles or glands. Epiphytes, or rarely terrestrial, with a creeping rhizome.

1. DENDROBIUM, Sw.

Anther cells longitudinal. Lateral sepals dilated at the base, forming, with the basal projection of the column, a pouch or *spur*. Pollen masses two, or four, in pairs. Labellum, with a broad erect base, usually expanded into lateral lobes. Stems or pseudo bulbs, bearing both leaves and peduncles.

In Australia the genus *Dendrobium* (having life, or living, on trees) finds its highest expression in Queensland, where 44 species are recorded. It is thus a tropical genus. Two species are recorded for Victoria, one extending to Tasmania.

1. *DENDROBIUM SPECIOSUM* (showy) Smith, Rock Orchid. Leaves from ovate to elongate-elliptical, on long stems or pseudo-bulbs, terminally crowded, rigid; racemes often above one foot in length, somewhat curved downward; flowers fairly large, numerous, 50-100 in raceme, cream-coloured, or pale yellow; sepals and petals nearly equal, usually incurved, three-quarter to one inch in length, lanceolate, the lateral ones forming, with the basal projection of the column, a short broad pouch. Labellum shorter than the petals, *nearly white, spotted with purple*, lateral lobes short and broad, the middle lobe broader than long. Column white, *often spotted with purple*.

Found chiefly on rock-faces in extreme east of State, near Cape Howe and Genoa River; also in N.S.W. and Queensland; flowers in spring. The strong, striated "stems," are called "pseudo-bulbs," and contain the stored nutriment necessary during the flowering period. They are often over a foot in length.

This is one of the best known of epiphytal orchids, and is usually sold and grown under the name of "Rock Lily." It is somewhat difficult to flower in cooler climates; but if watered well in summer, and kept almost dry from Easter, the flower spikes will often develop quite freely. In the tropics, more rain falls in summer than in winter, hence the reason for this treatment.

The Rock Orchid has very few pests, but Mr. Charles Barrett records that Rock Wallabies feed on the plants in Eastern Gippsland, wherever they find opportunity.

The Queensland variety, *Hillii*, has large, cream-coloured flowers. A pink form has been collected in New South Wales.

2. *D. STRIOLATUM* (streaked), Reich., Streaked Rock Orchid. Usually a rock-plant; generally dwarf, stems from ample creeping rhizomes; thin branched; *leaves narrow cylindrical*, one to four inches in length. *Peduncles one-flowered, rarely two*, on pedicels half-inch in length. Sepals and petals white or whitish-yellow, with three to five red-coloured streaks (striae) towards the base, about three-quarter inch in length; the short basal spur being present as in former species. Labellum rather shorter than the sepals, dilated in the middle into two broad lobes, the middle lobe recurved, the margins crisply undulate, the disc with three undulate raised lines or plates.

Found chiefly on rocks, rarely on trees, from Bairnsdale to far Eastern Gippsland. The short, roundly cylindrical leaves are numerous; the flowers are not abundant on the stems. This plant is quite a contrast to the "Rock Lily." The small, cylindrical leaves are quite unlike those of the former species, and very few flowers are ever present. This species occurs also in New South Wales, and on the east and north coasts of Tasmania. Figure 112 in Mueller's "Key."

TRIBE 2. VANDAE.—Anther lid-like, incumbent, usually deciduous. Pollen masses waxy, four, in pairs, on a single or double caudicle attached to a gland. Epiphytes or Terrestrials, with creeping rhizomes, or tuberous roots.

2. DIPODIUM, R.Br.

Terrestrial, with short, creeping, stout tuberous roots. Perianth segments free, nearly equal, spreading. Labellum sessile, erect, three lobed, lateral lobes shorter than the central one. Column erect, semi-cylindrical. Pollen masses two, waxy. Terrestrial, glabrous herbs, with imbricated (overlapping) sheaths at base of flowering stem, the upper ones becoming distant and bract like. *Flowers spotted.*

The genus *Dipodium* extends to Australasian islands, there being two species in Australia. The single Victorian species is leafless and presumably symbiotic; it lives in association with a fungus, which stimulates the root system into action and vigour. The name *Dipodium* (dis, double; podion, a little foot) has reference to the two stalks, or false caudicles of the pollinary apparatus.

1. DIPODIUM PUNCTATUM (spotted), R.Br., Hyacinth Orchid.—A fleshy, leafless, brown, stemmed plant, growing up to three feet in height, with an extensive system of thick brittle tuberous roots. Flowers numerous, *deep pink*, rarely white or yellow, spotted, in a loose raceme. Perianth segments (petals and sepals) free, similar, recurved or spreading, sepals about half-inch in length, petals shorter. Labellum sessile (without a stalk), erect, three lobed, the middle lobe longer than the lateral ones; lamina with two short, raised lines below the centre, uniting to form a hairy keel, ending in a woolly patch near the apex. Column about half as long as labellum. Anther hemispherical, lid-like, two-celled. Pollinia waxy bilobed.

Found commonly all over the State, especially in more open ground, and frequently after bush fires. The tall

Plate V.



SARCOCHILUS PARVIFLORUS, *Small Sarcocylus*, Lindl.



THELYMITRA INOIDES, Sw. *Dotted Sun Orchid*.

stems, with rich pink flowers, are conspicuous in December and January, and specimens have even been collected in May. The species disappears rapidly as population extends.

This is quite a conspicuous flower in the bush, and is much sought after about Christmas time. The tubers do not send up flowers every year, and all attempts to cultivate the species have failed. The thick, fleshy tubers are rather extensive in the soil, and are very brittle. Frequently, after bush fires, this orchid reappears in considerable numbers. Miss J. Galbraith records that, after the 1923 bush fires, near the Tyers River, *Dipodium punctatum* was unusually common, and its spikes of bloom were large and deeply coloured. This abundant occurrence was repeated twelve months later.

A white form has been recorded from the Grampians; while near Mudgee, in New South Wales, Mr. A. G. Hamilton found a greenish-yellow variety, with purplish spots.

3. SARCOCHILUS, R.Br.

Epiphytes; caudicle single; sepals and petals free. Labellum with a fleshy protuberance underneath, between the lateral lobes. Pollen masses four, connate into two, waxy. *Basal spur absent.*

This genus also is more tropical, although two species travel down into Victoria, one extending to Tasmania. The name, meaning "fleshy lip," is very suitable, although many orchids have a fleshy labellum. In some species, the labellum is like an inverted saddle.

1. SARCOCHILUS FALCATUS (sickle-shaped, referring to the leaves), R.Br., Snowy Sarcophilus.—Epiphytal; leaves almost oblong, usually falcate, two to four inches in length, and quarter to half inch in width. Peduncles (flower-stalk) scarcely exceeding the leaves. Flowers three to five, distant, *white*. Sepals and petals nearly equal, obtuse, half-inch long; the lateral sepals adnate to the base of the basal projection of the column. Lateral lobes of labellum large, ovate, the middle lobe short and broad, with a thick fleshy protuberance. Column short, with two prominent angles.

Found on trees near the Cann River, in East Gippsland; also in N.S.W. and Queensland. The white flowers, coming in spring, are very dainty and beautiful. In general appearance this species is somewhat like another New South Wales orchid, *S. Fitzgeraldi*, except that the



Key to Colour Plate opposite.

- 1—*Thelymitra grandiflora*, Fitz. 2—*Thelymitra venosa*, R.Br.
 3—*Thelymitra antennifera*, Hk.f. 4—*Calceana major*, R.Br. 5—
Diuris alba, R.Br. 6—*Caladenia congesta*, R.Br. 7—*Caladenia*
iridescens, Rogers. 8—*Caladenia praecox*, W. H. Nicholls.
 9—*Caladenia dilatata*, R.Br. 10—*Leptoceras fimbriatum*, Lindl.
 11—*Corybas unguiculata*, R.Br. 12—*Corybas fimbriata*, R.Br.
 (The Club is indebted to Mr. W. H. Nicholls for painting the
 original of this plate.)

Detailed description of illustrations (labella) on Plate IV.

Top:—1—*Pterostylis barbata*, Lindl. 2—*Calochilus campestris*,
 R.Br. 3—*Pterostylis concinna*, R.Br. Lower:—4—*Pterostylis*
nutans, R.Br. 5—*Caladenia Patersoni*, R.Br. 6—*Caladenia dila-*
tata, R.Br.



latter has the flowers spotted with crimson-lake markings.

2. *SARCOCHILUS PARVIFLORUS* (small-flowered), Lindley, *Small Sarcochilus*.

Epiphytal; recorded occurring on Blackwood, Hazel, Musk, *Pittosporum*, *Eriostemon*, Eucalypt, Sassafras and Blanket Leaf. Leaves thin, narrow oblong, somewhat falcate. Flower stems longer than the leaves; flowers up to six, calyx lobes and lateral petals greenish, lower petal white, lateral lobes conspicuous, spotted with red. Labellum nearly sessile, white, tinted with yellow, spotted or streaked with red.

Growing on trees, usually in moist gullies or adjacent to watercourses, from the Dandenong Ranges to the extreme east. The long, thin, pendant roots often are a foot or more in length. In humid weather the flowers are fragrant. The flowering season extends from September to December, according to the situation. This species usually occurs high up on the branches of the trees, so that it would thus escape general notice. It is often first discovered by the presence of the long, pendant, thread-like roots.

Owing to the infrequent germination of the seeds, this species reproduces very slowly. Colonies are not abundant; and one would here enter a plea for its preservation wherever seen, it is not readily established under cultivation, and care is needed to grow it successfully.

In secluded valleys in East Gippsland, I have seen boughs of the Blunt-leaf Wax Flower, *Eriostemon trachyphyllus*, F. v. M., literally covered with this lovely orchid.

There is a record that Baron von Mueller collected *S. parviflorus* at Apollo Bay, but it has not been seen in that district for many years. It is found also in New South Wales and Tasmania.

Contributions for the "Field and Study" pages of the *Naturalist* are needed, and country members especially are invited to forward notes. Cuttings from newspapers and other journals are not desired; but original observations, however briefly recorded, will be welcomed. Such contributions should be addressed to the Editor.

VICTORIAN FERNS

BY H. B. WILLIAMSON, F.L.S.

Part IX.

Genus *ATHYRIUM*.

ATHYRIUM UMBROSUM, Ait. Shade Spleenwort. Fig. I. T.; V.; N.S.W.; Q.; As.; Af.; Poly.; N.Z. This fern was included by Bentham under genus *Asplenium*, section *Athyrium*. It differs from *Asplenium* in having sori small, curved, mostly at the forks of the veins proceeding from the midrib. It is a shade-lover, frequenting alluvial soil in dark, shady forest country, and, although growing from three feet to five feet in height, it cannot be described as a robust fern, its fronds being very tender, and often drooping at the tips. The fronds are twice or thrice pinnate, secondary pinnules being about an inch in length, and often deeply toothed. Veins oblique, usually forked. Sori small, oblong, usually on the veins below the fork, or partly on one fork and then somewhat curved. Indusium similar to that of *Asplenium*.

Localities:—Dandenong and Otway ranges, and Gippsland. In the dark, jungle-like creek alluvial (e.g., Cann River, H.B.W.).

Genus *POLYSTICHUM*.

This was a section of *Aspidium*, but is now kept apart, and is distinguished by its peculiar circular, peltate indusium, like a mushroom, from under the rim of which the sporangia protrude.

POLYSTICHUM ACULEATUM (L.), Schott. Common Shield Fern. Fig. II. All parts of Australia except W.A. and N.A. All continents and Polynesia and N.Z. This is one of our most common species, sometimes known as "Cathead Fern," lining the upper water-courses in great profusion, generally associated with *Blechnum discolor*, and with it, persisting long after its natural shelter has been destroyed. Fronds rise one foot to two feet; they are twice pinnate, with the lower part of the stalk, and the whole frond when young, very shaggy, with dark brown chaffy scales, mixed with hair-like ones. Secondary pinnules about half-inch in length, prickly toothed, with a prominent angle or lobe on the upper or inner side. Sori usually six to eight on each

pinnule, with a peltate indusium seen as a circular cover in a young state, but shrivelled up and shapeless when advanced. Like *Asplenium bulbiferum* it may be propagated from the bulb-like swellings sometimes attached to the rachis of the pinnae.

There is a closely allied species in New South Wales, *P. aristatum*, Presl., which, in the bristle-like teeth of the pinnules much resembles the prickly-toothed form of *P. aculeatum*, Fig. IIb., but is distinguished by having light green and glossy fronds with the stipes scaly at the base, not shaggy hairy, and with few hairs on the fronds. It may yet be found in Victoria.

POLYSTICHUM ADIANTIFORME (Forst.), J.Sm. (*Aspidium capense*, Willd). Leathery Shield Fern. Fig. III. T.; V.; N.S.W.; As.; Af.; Am.; N.Z. Fronds six inches to two feet from a rhizome, often creeping on tree trunks, usually broad, rigid, pale, with scaly hairs on the rachis, mostly pinnate, but the smaller ones occasionally simply pinnate. Pinnules leathery, toothed or pinnatifid; veins concealed, but midrib prominent above. Sori round, large, one to each tooth or lobe. Indusium peltate and rigid, but much shrivelled on old sori. Common in the Otway and Dandenong Ranges, in Gippsland, and N.E. Ranges. IIIa., enlarged view of indusium; IIIb., sectional view of same.

POLYSTICHUM HISPIDUM (Sw.), Smith. (*Asp. hispidum*, Sw.). Hairy Shield Fern. Fig. IV. T.; V.; N.S.W.; N.Z. Fronds one to two feet from a thick rhizome, triangular in outline, usually thrice pinnate, with pinnules deeply divided into sharp-pointed lobes, each with a solitary vein. Frond stalk and primary rachis beset with long, fine, spreading, dark-coloured hairs. Sori solitary on the smaller segments or lobes. Indusium circular, attached by an almost central stalk. Dandenong and Otway Ranges (Johanna River near Crowes, H.B.W.).

Genus CYSTOPTERIS.

CYSTOPTERIS FRAGILIS (L.), Bernh. Brittle Bladder Fern. Fig. V. Vic.; Tas.; all continents and Poly. and N.Z. A delicate fern, with fronds six inches to nine inches in length, and two inches to three inches in width. Segments ovate or lanceolate, pinnatifid or dentate, with obtuse lobes or teeth. Sori several on each segment, at first enclosed in a tender, bladder-like indusium which folds upward over the sori, and which soon disappears under the enlarged globular sori, so that it may be mistaken for a large form of *Anogramma leptophylla*.



I., *ATHYRIUM*. II., III., IV., *POLYSTICHUM*. V., *CYSTOPTERIS*.

This species has been rarely gathered in Victoria. Baron von Mueller recorded it from the North-East—sent to him from the “Upper Murray”—with no definite locality. Mr. A. J. Tadgell’s discovery on Mt. Bogong in 1923, settled the question whether it was really a Victorian fern. Va., an enlarged view of a young sorus. Vb., sorus with indusium turned back.

Genus DRYOPTERIS.

This genus was by Bentham included under *Aspidium*. It differs from *Polystichum* in having the indusium reniform and attached by a stalk in the sinus on one side.

DRYOPTERIS DECOMPOSITA (R.Br.), Ktze. Shiny Shield Fern. Fig. I. All parts of Australia except W.A. and N.A., also in Polynesia and N.Z. A common fern, with fronds glabrous, or the stalks and primary nerves short-hairy, very variable in size and outline; from six inches to two feet, usually twice pinnate, with secondary pinnae pinnately toothed or lobed, the teeth acute, and the margins of the lobes usually nerve-like. Veins distinct, often showing on the upper surface by reflected light. Sori one or two on each principal lobe, not far from the margin. Indusium circular, reniform, often concealed as the sorus enlarges. Fig. Ic. shows early and late stages of the indusium. It grows in all parts of Victoria, except the N.W.

DRYOPTERIS PARASITICA (L.), Ktze. (*Asp. molle*, Sw.). Fig. II. All parts of Australia, except W.A. and Tas., also As.; Af.; Poly.; N.Z. Fronds one foot to two feet, from a short thick rhizome, usually light green, short-hairy and simply pinnate, three to five inches in length, truncated at the base, regularly pinnatifid, mostly sessile, lower ones gradually smaller and more distant, the lobes of the pinnae sometimes short, sometimes reaching above halfway to the midrib. Veins pinnate on each lobe, branches of adjoining lobes united in a vein tending to the sinus. Sori in a row about half-way between the midrib and the margin. Indusium circular, reniform, soon disappearing.

This is one of the most favoured ferns for cultivation. It has rarely, if ever, been gathered in Victoria. Its record for the N.W. of the State seems to be based on the specimens collected on “Murray cliffs,” Woolls (a collector in N.S.W.), and those gathered on “Cliffs on the Murray, Blanchetown,” S.A. The S.W. record is from specimens sent to Mueller by Mr. Callaway, from Curdie River, where it *may* have been collected in a wild state.



I., II., *DRYOPTERIS*. III., *HYPOLEPIS*. IV., V., *DOODIA*.

Genus HYPOLEPIS.

HYPOLEPIS RUGOSULA (Labill.), Smith, Syn. *Dryopteris punctata* (Thunb.), C. Chr., *Polypodium punctatum*, Thunb., *Phegopteris rugulosum*, Labill, and many others. Ground Hypolepis. Fig. III. All States except W.A. and N.A., also As.; Af.; N.Z. Fronds rising one foot to four feet, from a widely creeping rhizome, twice or thrice pinnate, their ultimate segments being half to one and a-half inches long, deeply dentate. Sori circular in two rows on the smaller pinnules or lobes, with no indusium, or with sometimes incurved edges of the pinnules suggesting a covering as in *H. tenuifolia*, from which it may be known by its more copious sori. It is also a smaller and coarser fern, and more common, being found in all parts of Victoria except the North West.

Hooker says in his "Species Filicum," under *Phegopteris punctatum*, Thunb. (*P. rugulosum*, Labill): "Perhaps no fern has been so generally misunderstood both in regard to genus and to the limits of the species, and this is partly owing to its being very variable, both in size and feature, and to the close proximity of the sori to the margin of the pinnules, and the frequent inflection of the lobes of those pinnules which give the appearance of an involucre of a *Cheilanthes* or a *Hypolepis*."

In the Trans. N.Z. Institute of July, 1926, H. Carse quotes from recent letters from Dr. Christensen, of Copenhagen, the author of "Index Filicum," regarding *Dryopteris punctata*, C. Chr.: "It is a true *Hypolepis*, not at all a *Dryopteris*, as listed in my Index. In the Supplement it is placed under *Hypolepis*."

In the same letter Christensen calls attention to the wrong spelling (*rugulosum*) of the species name of Labillardiere's plant, and to the difference of vestiture of *Hypolepis* and *Dryopteris*, a difference that cannot be made out by the unaided eye. A better vernacular name may yet be found for such a common fern.

Genus DOODIA.

This genus is distinguished by having oblong, linear sori arranged in one or two rows parallel to the midrib of the pinnae, and provided with a cover opening inwards.

DOODIA CAUDATA (Cav.), R.Br. Small Rasp Fern. Fig. IV. All States except W.A. and S.A., also Poly. and N.Z. The fronds rise to about a foot in height, from a tufted rhizome, and are simply pinnate, the pinnae being from one inch to two inches in length, scabrous and very variable in size. Lower pinnae are distinct, often broadly

auricular at the base, attached by the midrib only, and mostly barren. Intermediate ones are falcate, with a broad base, mostly fertile, and attached by the midrib only, the upper ones more adnate, the uppermost short and confluent into a lanceolate apex to the frond, which sometimes takes up half the length of the whole frond. Small, delicate forms have been found four or five inches long, and less than an inch wide with very narrow, distant pinnae. All parts of the State except the N.W.

DOODIA ASPERA, R.Br. Rasp Fern. Fig. V. Vic.; N.S.W.; Q. only. This can easily be distinguished from *D. caudata* by its having all its pinnae attached to the midrib by a broad base. It is a broader and more scabrous fern; its pinnae are rigidly serrate, the lowest being reduced to small, wing-like appendages to the rachis. The sori are almost globular, instead of being oblong as in *D. caudata*.

This species is not nearly so widely spread as *D. caudata*, and some confusion has occurred in its determination. The record, "all" in the Census is wrong, for many specimens of *D. caudata* have been labelled in error "*D. aspera*." The only specimens I have seen from Victorian localities are from Cape Howe (C. Walter), Orbost (E. E. Pescott), and Drouin (C. French).

The ferns named below were listed in the 3rd Supplement to the "Census of the Victorian Ferns" (*Vict. Nat.*, September, 1925), as Victorian species, but, in my opinion, this was a mistake, and was due, in the case of some species, to errors in determination, and in others to insufficient evidence as to the locality from which the specimens were obtained:—

Alsophila Cooperi, F. v. M.; *A. Rebeckae*, F. v. M.; *Dryopteris queenslandica*, Domin.; *D. tropica*, Domin.; *D. glabella*, C.Chr.; *Asplenium adiantoides*, C.Chr.; *Polystichum aristatum*, Presl.; *Blechnum serrulatum*, Richards; *B. laevigatum*, Cav.; *Cyclophorus rupestris*, C.Chr.

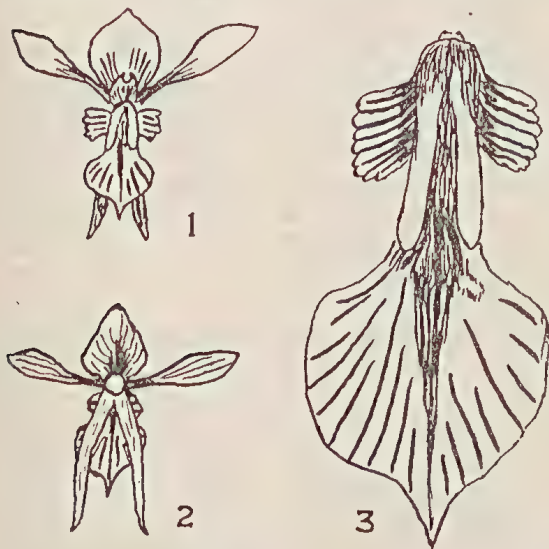
In concluding this series of articles, I desire gratefully to acknowledge the help I have received from Messrs. Audas and Morris, of the National Herbarium, where, through the courtesy of the Government Botanist, Mr. F. Rae, I am privileged to make searches among the numerous specimens and the many valuable books in that institution. The valuable series of papers on Victorian Ferns by Mr. C. French, Senior, in the *Southern Science Record*, 1881, and the popular article by Mr. F. Pitcher (*Victorian Naturalist*, May, 1913) have also been of much assistance to me.

A NEW SPECIES OF *DIURIS*.

BY THE REV. H. M. R. RUPP, Paterson, N.S.W.

In January of the present year, Mr. C. Barrett visited the Barrington Tops Plateau, at the head of the Hunter and Paterson River valleys, N.S.W., and on his return he kindly brought me specimens of several interesting terrestrial orchids. Among them was a *Diuris*, of which I had previously received imperfect material, and which I believed to be an undescribed species.

Through the courtesy of Professor Harrison, of Sydney University, and of Mr. E. Cheel, Curator of the National Herbarium, Sydney, I was able to inspect dried specimens of the same orchid, and to compare them with those brought by Mr. Barrett. Dr. R. S. Rogers and Mr. Cheel endorsed my opinion, and the Linnean Society of N.S.W. accepted, for its August meeting, a description which I prepared of this plant, under the name of *Diuris venosa*.



DIURIS VENOSA, n.sp.

1. Flower, front view, natural size.

2. Flower, back view, natural size.

3. Labellum from above, flattened out, enlarged.

To Mr. J. L. Boorman, formerly collector for the late Mr. J. H. Maiden, belongs the credit of first bringing the orchid under the notice of the authorities. His specimens, collected in 1915, are now in the Sydney National Herbarium, where they were regarded as doubtfully conspecific with *D. spathulata*, Fitzg. The latter is a plant of the dry western plains, whereas *D. venosa* grows in boggy places, at 5,000 feet.

The mid-lobe of the labellum of *D. venosa* is spatulate, as in *D. spathulata*, but instead of the transverse ridges characteristic of the latter, it is longitudinally veined, and the lateral lobes are more prominent, crenulate on the margins, and heavily veined. The general colour of the flower is lilac, all segments except the lateral sepals being strikingly veined with reddish-purple lines. The flowers are not large, but the colouring makes this a very attractive little species of the endemic Australian genus to which it belongs.

WHERE *D. VENOSA* GROWS.

Among the foothills, heat and dust made travelling unpleasant, when, with Mr. John Hopson, I began the long ride from Eccleston to the Barrington Plateau. Before sunset we had passed from mid-summer into spring.

We rode slowly through a brush of beech trees (*Nothofagus Moorei*), across the Gloucester Tops, and at last, from a belt of Eucalypts, into open country—a wide, sunlit space of the Barrington Plateau, where a lake might have been in old time, but green now, with dark morass areas, and the narrow, gleaming ribbon of a creek woven through it—from hills to hills a mile away. The track goes where the land is firm, over level ground and green undulations. And all the way we rode in alpine gardens, millions of wild-flowers, pearly with mist or dew. The scene brought memories of Palestine in spring, though here were none of the red poppies, our flowers for remembrance: the dominant colours were yellow, pink, and blue. Pimeleas toned the splendour with white blossoms.

Close to the cattlemen's hut, sole habitation on the Tops, I found my first specimens of the new *Diuris*, growing among grasses and marsh-plants. I went ankle-deep in ooze to gather them. The flowers, lilac and rose-purple, are dainty as small butterflies; and beautiful as any terrestrial orchids known to me. *D. venosa* is chiefly a swamp-dweller, but it grows also, if sparingly, on the "downs," among Bluebells and tall Helichrysums, and pygmy plants, with sage-like flowers, the colour of lavender.

The *Diuris* seemed at first to be rare; but when I knew its preferences in location, I found it to be fairly plentiful. Here and there a lonely plant occurred; in some spots dozens were seen at a glance. I would call it the princess of its genus; and could wish that it grew in our State. How is fertilisation of this orchid effected?

By insects certainly. In each of several blossoms examined, was a small dipterous fly. In Floral Biology we have a vast field, almost untilled. Is it presumption for a "general" naturalist to suggest to botanists, that study of the relations between insects and plants, is more profitable than dealing with problems of nomenclature? Assuredly, it comes within the province of the field naturalist, and may be commended to young members, especially.—CHARLES BARRETT.

F.N.C. ORCHID SECTION.

At a meeting of the Orchid Section of the Club, held at the National Herbarium, on August 4, it was resolved that the rule applied to visitors should read as follows:—"That all members of the Victorian Field Naturalists' Club who attend the meetings of the Section and pay the subscription, shall be allowed as members." Interested persons may attend as visitors.

After examining the literature on the question, it was decided to recommend to the Plant Names Committee, that *Corybas*, Salisbury (1807), be adopted for *Corysanthes* (1810), in accordance with the rules of the Vienna Conference, 1905. Further, that *Spiranthes sinensis* (Pers) Ames, be adopted for *S. australis*, Lindl. "Austral Lady's Tresses," and *Microtis unifolia*, Reich. for *M. parviflora*, R.Br., "Slender Leek-orchid," and *M. porrifolia*, R.Br. Concerning the two latter species, Prof. Oakes Ames, A.M., F.L.S., says:—"They resemble *M. unifolia* too closely to be separated from it, or to be identified with any other allied species."

Between South Sassafras, now called Kallista and The Patch, in the Dandenong Ranges, there is a small piece of forest that has so far escaped the woodman's axe. It lies in the hollow just below the garden of Mrs. Chomley's house, "Glen Elva." Here, on Sunday afternoon, August 22nd, I was fortunate enough to hear and see a small flock of Black Cockatoos, *Calyptorhynchus funereus*. There must have been more than a dozen, flying among the Blackwoods, Silver Wattles, and Mountain Ash trees, and their wailing, mournful cries were unmistakable. Though this bird is common enough further back in the ranges, it is, I am told, an infrequent visitor to the Dandenongs. One resident told me that the coming of these funereal birds is looked upon as a sign of rain. If so, they proved bad prophets in this instance, as we had beautiful weather.—A. E. KEEP.

A NEW VICTORIAN ORCHID.

BY W. H. NICHOLLS.

(*Read before the Field Naturalists' Club of Victoria,
August 9th, 1926.*)

After a critical examination of the various forms of *Caladenia* occurring in the different States, more particularly those bearing white flowers, some of them differing in a morphological sense also in habit, but included under one specific name, I have concluded that our earliest-flowering white *Caladenia* is distinct and fully deserving, of specific rank. It is fairly numerous in some districts, especially around Bayswater, Ringwood, Eltham, and Whittlesea. It has been confused with the white form of *Caladenia carnea*, R.Br., *Caladenia angustata*, Fitz., and *Caladenia cucullata*, Fitz.; but it differs from all three species, in several important particulars.

CALADENIA, PRAECOX, N.SP.

Planta gracilis, circiter 15 cm. alta. Caulis erectus, prope medium, bractea parva. Folium longum, lineare hirsutum. Flores 1 vel 2, albi, pedicellis gracilibus. Sepala lateralibus et sepalo dorsali, subaequalia, circiter 12 mm. longa; falcato-lanceolata vel elliptico-lanceolata, hirsuta, glandulosa; linea centrali, viridi, infra, longitudinaliter diffusa. Petala et sepala, lateralibus patentia. Sepalum dorsale, erectum, incurvatum, concavum. Labelum album, apice purpureum, basi angustum, erectum, deinde recurvatum, obscure 3-lobatum. Anteriori tertia parte excepta denticulatum; loborum apices obtusi, marginibus breviter, denticulatis. Calli 4-seriati, robustiusculi, fere sessiles. Columna 6 mm. longa, gracilis, purpurea maculosa. Anthera abrupte acuta. Stigma orbiculares.

The vernacular name, White Dove Orchid, has been suggested for this species.

For specimens from the following districts, I am indebted to Mr. A. B. Braine: Bayswater, Ringwood, Greensborough, Diamond Creek, and Croydon. Flowering season: July, August, and September. (August, the best month.) Type in National Herbarium, Melbourne.



Figs 1.

W.H.N. 1926.

ORCHID LABELLA.

(a) *Caladenia praecox*, n.sp., typical plants. (b) Labellum from above. (c) Labellum from below. (d) Labellum from side. (e) Tip of Labellum. (f) Column from front. (g) Column from side. (h) Dorsal sepal from front. (i) Dorsal sepal from side. (j) Calli.

A graceful and rather slender species, about 15 cm. in height. Stem with a small acute bract, near the middle, and thickly covered with short hairs. Leaf very long, narrow-linear, sparsely hirsute. Flowers, 1 to 3, on slender pedicels, with an acute bract, about 8 mm. in length, clasping the flower pedicel. Perianth-segments, falcate-lanceolate or elliptic-lanceolate, thickly covered with reddish-brown or purplish glandular hairs and glands; except on the inner surface and at the base, where they are white. A diffused greenish longitudinal stripe down the centre of the five segments, on the under side. Lateral sepals and lateral petals, spreading, narrow at the base; the latter hardly as long as the sepals, measuring about 12 mm. Dorsal sepal, concave, incurved, its apex reaching to a point exactly in line with the apex of the decurved, recurved labellum; forming a graceful hood; but not covering the column so much as in either *Caladenia cucullata*, Fitz., or *Caladenia angustata*, Fitz. Labellum erect at base, thereafter arching and appreciably recurving at the tip, white with a purple blotch at the tip; not widely spread, hardly 3-lobed, markedly denticulated or fringed, except the forward one-third. Lobes obtuse, somewhat truncately terminating about the bend. At the tip, margins somewhat crisped or irregularly and shortly denticulated, forward half much recurved. Calli, usually short and stout, clavate, yellow tipped, in 4 somewhat regular rows reaching almost to the tip; where they are sessile, those at the base almost sessile. Column about 6 mm. in length, slender, irregularly spotted or blotched with red, very pretty. Anther, abruptly acute. Stigma, circular. Specimens with the musky odour of *Caladenia testacea*, R.Br., its nearest ally, have been collected, but they are rare. Specimens have been collected this year, with the base of the plant, also the tips and the under-surface of the five segments, plentifully marked with reddish-purple.

In some parts of Gippsland, King Parrots, *Aprosmictus scapularis*, are abundant, and many may be seen often at Beaconsfield, for instance. Lately a number of young examples was received at the Zoological Gardens. Even in immature plumage, these birds are beautiful.

CORRECTION.—*Naturalist*, August, 1926. Last line, p. 114. For "Another" read "Anther."

NOTES ON THE FLY *BOREOIDES SUBULATUS*,
HARDY.

BY J. A. KERSHAW.

Although not uncommon, this extraordinary fly is not well-known, and, so far as I can find, nothing has been published regarding its habits.

The male is winged and of a brownish colour, the legs reddish, dark-brown at joints. Length, about 15 mm. The female is wingless, about 20 mm. in length, and usually of a dark-brown colour, with a dark transverse band on each of the first three or four abdominal segments. The legs are reddish, dark brown at each joint. The abdomen is much attenuated, the basal segments broad and greatly distended, the remainder tapering gradually to the apex. After the eggs have been deposited, the abdomen becomes noticeably shrivelled. The fly's movements are extremely sluggish, and when walking, the body is elevated, with the tail dragging on the ground.

The eggs are very numerous, elongate, and whitish in colour. They are laid in clusters, usually in more or less decayed wood, upon which apparently the larvae feed. The insects appear during April and May, the females often in very great numbers.

The remarkable appearance of the wingless female, with its long, slender legs, and swollen, attenuated abdomen, together with its very sluggish movements, make it somewhat repulsive, and few recognise it as a Dipterous fly.

As early as April, 1860, the first specimen, a female, was collected by the late W. Kershaw in the Melbourne Botanical Gardens, "on rushes bordering the swamp." In 1868 specimens were sent by the National Museum to the late Francis Walker, of the British Museum, for identification, and were returned labelled *Boreomyia subulata*. The species continued to be known under this name until 1920, when, finding that Walker had apparently never published a description, G. H. Hardy described and figured it under the name of *Boreoides subulatus*.

As a lad, I frequently took the females at St. Kilda, Caulfield, and Brighton, occasionally on trunks of trees, but more often on old post-and-rail fences, where they

would be found with the extremity of the abdomen inserted in crevices and holes in the wood, in the act of depositing their eggs. The male was not known until many years later.

My attention was particularly drawn to this insect in May, 1919, by Mrs. M. E. Pigott, of Murrumbena, who, with her sister, was greatly concerned by the appearance of large numbers on the verandah of their home, and who was naturally anxious to learn whether they were harmful. They appeared in hundreds, crawling over the verandah and up the walls, and even entering the house. Similar invasions occurred in this locality for several years.

On April 6th, 1924, Mrs. Pigott wrote:—"The *Boreoides* yearly haunt our house for a few weeks, in myriads. I placed a box and some decayed wood on the verandah, where they thronged, and many eggs were deposited." In another letter—"The insects come in dozens over the edges of the verandah at both sides of the house every morning. We swept them into pans and drowned them. On one occasion we placed a large number in a bucket of water, where they remained from Thursday morning until Saturday. I then poured them out on to a sheet of paper to dry, before burning them; but in the afternoon I found them all alive, crawling over each other and laying heaps of eggs."

In May of this year I found these flies in similarly great numbers at Mentone, crawling over the verandah and up the walls of a house, and on the trunks and branches of trees and shrubs in the garden. The bodies were greatly distended with eggs, which they were depositing in cracks and joints of the hardwood weatherboards and flooring. In many instances, so firmly was the abdomen wedged into the openings, that it required some care to remove them without injury. Although a careful search was made, only one male was found.

In company with the *Boreoides* were several specimens of a small parasitic Hymenopterous fly, apparently a species of *Evaniidae*, shiny black, with extremely long, curved abdomen. In two instances these had their abdomen deeply inserted into small cracks in the weatherboards, apparently parasitising the eggs of the *Boreoides*.

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EXCURSIONS.

SATURDAY, SEPTEMBER 11.—Sherbrook Gully. Object: General. Leader: Mr. E. E. Pescott, F.L.S. Meet at Flinders Street in time for 9.10 a.m. to Belgrave. Lunch to be taken. The Leader will meet members travelling by the 12.48 p.m. train from Flinders Street to Belgrave, at the Picnic Ground, at entrance to the Gully.

SATURDAY, SEPTEMBER 18.—Royal Park. Object: Physiology, etc. Leader: Mr. R. E. Luher, B.A. Meet at Royal Park Station at 2.30 p.m.

THURSDAY, SEPTEMBER 23 (SHOW DAY).—Mornington. Object: General. Leader: Rev. G. Cox. Meet at Flinders Street in time for morning train. Lunch to be taken (tea and milk will be provided).

SATURDAY, SEPTEMBER 25.—Ringwood. Object: Insects. Leader: Mr. F. E. Wilson. Meet at Flinders Street for 1.3 p.m. train.

SATURDAY, OCTOBER 2.—Balwyn. Objects: Maling's Quarry and "Maranoa" Wildflower Garden. Leaders: Messrs. F. Chapman and L. L. Hodgson. Meet at Mont Albert Tram Terminus at 2.30 p.m.

TUESDAY, OCTOBER 5.—Wild Flower Show; St. Kilda Town Hall; 2.30-10 p.m.

SATURDAY, OCTOBER 9.—Yarra Junction. Object: Orchids. Leaders: Messrs. E. E. Pescott, F.L.S., and C. French, Jr. Meet at Flinders Street for 8.21 p.m. train.

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OCTOBER, 1926.

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— OF —

The Field Naturalists' Club of Victoria

Published 5th October, 1926

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The Author of each article is responsible for the facts and opinions recorded.

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1926

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 11th OCTOBER, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS

PROPOSER:

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Mr. F. T. Cleeland,
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Mr. P. R. H.
St. John Mr. L. L. Hodgson

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural history specimens should bring them to the Club's meetings, and, if possible, make a few remarks concerning them. Please remember that notes are required for the "Naturalist."

6. Reading of Papers and Discussion thereof.

By Mr. H. B. Williamson, F.L.S.—"Some Interesting Native Plants." Illustrated with lantern slides.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a brief description thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

Members are invited to exhibit objects of interest, and to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

The Victorian Naturalist

VOL. XLIII--No. 6.

OCTOBER 5, 1926.

No. 514.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, September 13th, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 70 members and friends were present.

CORRESPONDENCE.

From Mrs. James Yeates, Bairnsdale, suggesting that the Club should take action with a view to having Mallacoota and its environs declared a sanctuary. On the motion of Messrs. C. Daley and H. B. Williamson, it was decided that this matter be referred to the Committee.

REPORTS.

Reports of excursions were given as follow:—Black Rock, Mr. H. B. Williamson, F.L.S.; Cheltenham, Mr. J. Wilcox; Sherbrooke Gully, Mr. E. E. Pescott, F.L.S.

ELECTION OF MEMBERS.

On a ballot being taken, the following were elected:—Miss A. Butler, Alexandra Avenue, Canterbury; Mrs. T. H. Sarovich, White Horse Road, Surrey Hills; Miss D. Ross and Miss E. Colebrook, Church of England Girls' Grammar School, South Yarra; Miss A. Paterson, 275 Bay Street, Port Melbourne, and Mr. W. Ramm, 654 Station Street, North Carlton, as ordinary members; and Mr. Eric Haslem, Bluff Road, Sandringham, and Mr. Andrew Taylor, Estella Street, Glen Iris, as Associate members.

GENERAL.

The President referred to the invitation extended by the combined Progress Associations of the Shire of Fern Tree Gully to an inspection of Sherbrooke Forest and a Conference to be held at Belgrave on September 18th, and requested as many members as possible to attend.

Mr. A. D. Hardy explained that the delay in proclaiming Sperm Whale Head a sanctuary, was due to the desire of M. F. Lewis, Chief Inspector of the Fisheries and Game Department, to include a larger area than was originally contemplated.

PAPERS.

"Some Notes From a Diary of Allan Cunningham," by Mr. C. Daley, B.A., F.L.S., being extracts from a journal in which this botanist recorded observations during travels in Queensland and Norfolk Island.

"Around the Yan Yean," by A. E. Rodda, in which the author described various features of interest in this locality.

Dr. C. S. Sutton and Mr. C. Daley, B.A., F.L.S., gave short accounts of their recent visits to Queensland and Western Australia respectively.

EXHIBITS.

By Miss J. Raff, M.Sc., F.E.S.: Photograph of Processionary Caterpillars taken in Western Australia; also specimens of the caterpillar.

By Mr. G. Coghill: Cultivated specimens of *Micromyrtus ciliatus* (Fringed Heath Myrtle), and *Grevillea rosemarinifolia* (Rosemary-leaved Grevillea).

By Mr. E. E. Pescott, F.L.S.: Cultivated specimens of *Thryptomene*, *Calycina*, *Chorozema cordata*, *Eriostemon myoporoides*, *Hovea elliptica*, *Dendrobium gracilicaule*, *D. Beckleri*, and *D. Kingianum album*.

By Mr. D. Paton: Specimen of *Pterostylis nutans* (Nodding Greenhood), 20 inches in height, collected at Boronia.

By Mr. H. B. Williamson, F.L.S.: (1) Specimens of *Eucalyptus neglecta* (Maiden), "Omeo Gum," collected on the Buffalo River, by Mr. W. Mitchell (previously collected only in Omeo district). (2) Orchids collected at Boronia.

By Mr. A. E. Rodda: Branchlets of Boobyalla (*Myoporum* sp.), showing gall swellings, from Brighton Beach.

By Mr. C. Borch: Nineteen species of *Lycaenidae* ("Blues") from North Queensland, showing dimorphism in the females of *Ogyris zozine*, and including such rare forms as *Ogyris aenone*, *Miletus apollo*, *Arhopala wildei* and *Bindahara isabella*.

By Mr. C. Daley, B.A., F.L.S.: Surface limestone (concretionary) from Nullabor Plain; Ironstone nodules (concretionary) from Narrogin, W.A.; *Dryandra floribunda*; Native Pear, *Xylomelum occidentale*; and other botanical specimens from Western Australia; shells from N.-W. Coast, W.A.; from home-garden, *Lhotzyka genetylloides*, *Calytrix Sullivani*, *Micromyrtus ciliatus*, *Thryptomene Mitchelliana*, *Chorozema cordata*, *Brachysema lanceolata*.

NOTES FROM A DIARY OF ALLAN CUNNINGHAM.

BY CHAS. DALEY, B.A., F.L.S.

(Read before the Field Naturalists' Club of Victoria, September 9th, 1926.)

Among some letters and papers left by Baron von Mueller, forgotten for many years, and when re-discovered placed at my disposal for perusal, was an old notebook, which had served the purposes of a rough journal in which Allan Cunningham, the Australian botanist, recorded some experiences of his wanderings in the years 1828 and 1830.

The diary is very incomplete, some of it illegible, and consists of two parts: the first comprising some scanty particulars of a visit to the penal settlement of Moreton Bay in 1828; the second with an account of an excursion to Norfolk Island in 1830. The book has on it the words "Part of Allan Cunningham's Journal . . . with the Revd. Rt. King's kind regards, June 10th, 1868." I should think that this inscription denotes the donor of the book, and probably the date when it was given to the Baron. The Revd. Rt. King may have been a son, or a nephew, of Capt. P. P. King, with whom Allan Cunningham had sailed as botanist on surveying voyages to Western Australia, Tasmania, and New South Wales. This conjecture, if correct, may account for Mr. King's possession of the journal. The writing is very small and indistinct, and some words are unintelligible.

Allan Cunningham was born in 1791. He early evinced a liking for botany, and was employed to collect plants for Kew Gardens. He visited South America and New Zealand with this object. Coming to Australia, he accompanied Oxley in exploring the Lachlan and Macquarie Rivers, securing about 450 species of plants, many of them on the Blue Mountains. Then, as botanist, he accompanied Captain P. P. King on a surveying voyage to King George's Sound, Dampier Archipelago, and Goulburn Island, securing 300 species of plants. In the same year he visited the district about Illawarra, and again went with Capt. King to Hobart and Macquarie Harbor. During the next three years he explored and collected plants from Port Macquarie to Cambridge Gulf.

In 1822 the botanist again visited Illawarra, explored through the Blue Mountains to the head of the Macquarie, and discovered Pandora Pass, and the rich Liverpool Plains. In 1824 he explored the sources of the Murrumbidgee and the Brisbane River. The following year's

wanderings included the Nepean River, then the Hunter River, above Pandora Pass, and further observation of the Liverpool Plains to the North.

In 1827, Cunningham, from Segenhoe Station, on the Upper Hunter, crossing Oxley's Track, entered new country, which, unpromising at first, led to a fertile valley and the discovery of the Gwydir and Dumaresque Rivers, and the far-famed Darling Downs. The Condamine River was named, and he endeavored to find a practicable passage over the ranges to Moreton Bay, the discovery of Cunningham's Gap giving the subsequent solution.

In 1828, with Charles Fraser and Capt. Logan, from Moreton Bay, Cunningham went up the Logan River, and ascended Mt. Lindsay; afterwards, from Limestone Station, on the Bremer, they penetrated the ranges through the Gap to Darling Downs, thus securing means of access from the coast to the Downs.

In 1829, his last Australian exploration, he reached the source of the Brisbane River.

Allan Cunningham did splendid work as a botanist and an intrepid explorer. In 1836 he was appointed Colonial Botanist of New South Wales. He died in 1839, leaving an honorable record of service in science and discovery. His name is commemorated in the Coniferous genus, *Cunninghamia*, and in the familiar Hoop Pine, *Araucaria Cunninghamii*.

Omitting the notes of the first expedition, only interesting, firstly, as giving a passing view of the penal station at Moreton Bay in 1828—a scanty settlement which Cunningham, with foresight, designates “the foundation of a large city ere long”; and, secondly, as marking a preliminary stage to the important discovery of an accessible route through the ranges from Moreton Bay to the Darling Downs, the following account of a botanical excursion to Norfolk Island is gleaned from the faded pages of this incomplete diary.

VISIT TO NORFOLK ISLAND.

The journal commences with the date of May, 1830. “The Barque, Lucy Ann, ordered to proceed with convicts to Norfolk Island.” On May 4th the barque sailed on the voyage, Allan Cunningham having obtained permission to go on the vessel. As in a previous case, the barque was employed in removing convicts, of whom there were 50 re-convicted felons on board, to be taken to Norfolk Island, under the charge of an officer of the

39th Regiment, and his men. With favorable winds, the barque made progress, and on May 7th passed a remarkable rock called Bate's Pyramid, a few miles south-east from Lord Howe's Island. With fine weather, a strong current swept the vessel upwards of 70 miles beyond the position assigned her by reckoning.

At sunset Norfolk Island was sighted, and as the vessel lay to between it and Phillip Island, at the southwest extremity, a flag was hoisted on shore. Landing could not be effected owing to the strong winds prevailing, which caused huge breakers. Allan Cunningham, anxious to land, worked round in a boat to Cascade Bay, from which he walked to the Sydney Bay side, about four miles distant by road. Here he first observed the vegetation. He noticed plants similar to some that he had seen in New Zealand, "the golden fruit of the lemon and guava . . . exhibiting a rich and pleasing diversity when contrasted with the extremely beautiful dark hue of the prevailing laurel-like foliage of the plants." *Phormium tenax* was frequent more particularly on the rocky cliffs of the island. *Dodonæa orientalis* and *Arecas* or Palms were seen. "The robust climbing plant, *Pandonæa*, originally noticed by Sir Joseph Banks, at the discovery of the island by the immortal Cook, and of which a drawing was made by Mr. Fred Bauer on his visit here in 1804" was in full growth. Only female flowers had then been obtained. "This deficiency," says the botanist, "it was extremely gratifying to me to supply in 1827, when I gathered fine specimens of the male and female flowers in September from the swampy Kahikatoa woods of O'Kiangra and Cowa Cowa, where the plants, with the rooting stems, twist themselves up to the very summits of the lofty pines, where not infrequently they attain the height of 120-150 feet. The whorl bracts which are fleshy, are so much sought after by the New Zealanders who devour them with avidity, or any of the saccharine matter they contain, that I recollect I had no small difficulty in obtaining perfect specimens, notwithstanding the great abundance produced by each plant."

Cunningham waited upon Colonel Moment, the Commandant, who gave him a warm welcome, and approved of his object. A constable well acquainted with the island, was ordered to attend him on his daily excursions. For the next two days the strong winds prevented communication with the vessel, but on the 14th, the weather moderated, and "the prisoners, soldiers and

baggage were safely landed." On June 1st the weather was boisterous. An excursion was made on the west side of the island to Mount Site, estimated at 1,200 feet in height, where there were deep and shaded ravines, with ferns and mosses, and as Cunningham hoped, new species of plants.

Desiring, if weather permitted, to spend a few days in examination, he was accompanied by an officer of the 39th Regiment, "who, availing himself of my tent to pass a night or two in, promised himself a long day's hunting with his dogs on the cliffs beneath the mountain where the few wild goats that remain on the island take shelter." The tent was pitched on cleared ground about $5\frac{1}{2}$ miles on Anson's Bay Road. Hanson formerly occupied it, and gave the name to the bay at the foot of the mountain. From June 4th to 7th there were clouds, wind, and showers, five wet days preventing much collecting.

Cunningham notes that the thermometer did not fall below 65 degrees, nor rise above 68.5 degrees in the 24 hours. A slight break was followed by showery weather, then soaking rain on the Sunday. On Monday the weather was fair, thermometer 67 degrees. He examined the neighbouring brushes, hoping to find the flowers advanced by the rain. He observed *Blackburnia pinnata* (Forster), *Elastostema*, with female flowers, *Myrsine urceolata* (flores polygami) with permanent flowers, *Acalypha morioides*, and *Sapindus laurinis nitidis* without flowers. In a five-mile walk there was little change. In a ravine under Mt. Pitt the *Pandorea* was bearing fruit. On June 8th, in an excursion along Anson's Bay Road, he saw the Bloodwood, *Croton laurinus*, *Elastostema*, *Zieria laurina*, *Morinda macrophylla*, as the most abundant species of plants, and in the shaded wood a *Euphorbia*, a beautiful *Aspidium* with fruits, and a *Clematis* with diæcious flowers.

On June 9th the botanist intended to go to Phillip Island, but the weather was very adverse. "In my walks through the thickets," he says, "I met with a timber-tree bearing its fruits which I had not previously seen. Its fruit was a five-winged capsule, supported on a long pedicle, beneath which was a persistent calyx. It rose to a tree 50 feet high, and its timber was of close grain and hard. The fruit of *Croton laurinus*, or Bloodwood, was also gathered to perfect my specimens. The tree suspected to be *Blackburnia* (G. Forster) is now in fruit,

the character of which it is most desirable to know, as it appears that able naturalist, when he framed the genus, was entirely ignorant of the character of that part of its fruits. . . . It attains 40 feet." "On its trunk grew a small single-leaved plant of the *Epidendra*, very similar to my *Dendrobium* from the Five Islands, N.S.W. In returning home I gathered a paper of the ripened seeds of *Luzuriaga*. (See Br.)."

On Saturday, June 12th, Cunningham was preparing for the excursion to Phillip Island. Rough weather again intervened, the surf was considerable, and postponement was necessary; so, instead, he went to the north-east of Norfolk Island to Steele's Point, taking the Cascade Road to the Coffee Tavern, or Drandt's Farm. He found the bush dense, difficult, and almost impenetrable, the soil soft and spongy. The wild offspring of poultry left on the island by original settlers, roosted on the trees, and fed at daylight or evening. The North-East Point was reached in an hour. The cliff was 200 feet in height, but his friend descended them. He met only a plant of bushy herbaceous growth of the Amaranthaceae, Cyperus-looking, with Xerotes leaves (the razor-grass). He gathered duplicate specimens of *Polygonum fruticosum*, and of *Hovea monodica*, stamens eight.

It was not until June 17th that conditions were favorable for landing on Phillip Island, at a rock on the north side of a small bay. A camp was made for two or three days. The botanist ascended an acclivity to a ridge, destitute of soil; and in two hours' walking traversed the circuit of the island, which was lofty in the south, one point rising to a roundabout cone of red earth, probably about 1,200 feet above sea-level, devoid of trees or shrubs. The coast had steep cliffs on all sides. In the interior were some deep, wooded hollows, with plants similar in character to those of Norfolk Island. The rambling, thorny *Capparis* was generally distributed, rendering the scrub hard to penetrate on account of its thorns. The paths of swine and of goats were numerous. He was disappointed at not meeting herds of each animal, which had been in undisturbed possession of the island for twelve months. No pigs were seen, but a few goats were on the steepest parts of the cliffs. Four males were killed, and a female was captured for milking.

Only two plants different from those of Norfolk Island were observed, an *Hibiscus*, like that of Port Macquarie, and a *Polygonum*, like that of New Zealand. The

Capparis, with abundant fruit, like unripe lemons, was also in flower. *Blackburnia* in flower confirmed the opinion formed of the *Apocynææ*. The fruit was eaten by the wild swine. A small, slender, brambled shrub, with 3-lobed leaves like *Lasiopetala* of King George's Sound, or the white-thorn of Great Britain, was seen, but not in flower or fruit. It might be the *Plagianthus* of Forster, New Zealand.

Rain set in for four days. On June 30th, it cleared, and having returned to Norfolk Island, Cunningham again went over the Cascade Road, and thence over a new cross-line of road to find some plants "yet *desiderata*" of his herbarium, or to clear up doubts in regard to genera, etc. He states:—"I was really gratified to find the slender tapering tree with large glossy leaves, which I had suspected to be *Rubiaceæ*; and even of the genus *Morinda*, advancing to a flowering state, and although the umbelliferous panicle it had pushed forth was among its magnificent leaves, it was exceedingly young. I observed enough to settle its genus. It is an unpublished *Aralia*. The Soft Whitewood remains still as it was, as there is no flower or fruit. Its genus I have yet to discover. On examining again the *Alyxia*, still in flower, I clearly made out two distinct species, the one with greenish ovate-lanceolate leaves, and smooth panicles, the other with obovate, elliptical, quaternate leaves and downy branches. The *Aralea* (*spathulata*) has the soft, sappy wood, scarred trunk, and small and crowned fruit of the genus. The plant taken for *Exocarpos* (*saligna*) is clearly a specimen with handsome flowers. Gathered more of the *Viscum*, growing on *Pittosporum microcarpum*, everywhere in flower. *Rugosia* (?) are now in young fruit. Gathered some *Guinea-grass* to examine."

The first three days of July were stormy. On the 3rd Cunningham visited Anson Bay, the thermometer varying little, 62 degrees—68 degrees. He writes:—"In this excursion of six months from the settlement, I added no specimens . . . not previously procured, but I gathered fresh ones." He has a note about a curious land-snake that was thrown up. The lower jaw had fangs. The reptile was 30 inches in length, and had two claw-like appendages at the extremity of the tail to assist in springing."

On July 5th, in a walk in the neighbourhood of the settlement to the north-east, the botanist noticed

Forster's *Buphthalmium uniflorum* in flower; Monkswell, growing on cliffs and flats, in flower and fruit; and *Aralia spathulata* everywhere, in flowering condition.

On July 6th the weather became fine, but again broken and stormy. On the 12th, he visited the road to Bates's Bay. A dense brush, with Guinea-grass, was on each side, and Soft Whitewood, or *Hibiscus Patersoni*, was more frequent on the roadside than elsewhere. *Laurus*, *Croton*, and *Solanum* were observed, also *Dendrobium* growing on old timber.

The botanist was satisfied that he had gathered every plant the island produced. He writes:—"The period is now drawing near when a vessel from the colony may be expected, by which it is my intention to return to Sydney, with the small collection of trees, dried plants, etc." One might infer that he was somewhat disappointed with the results of his excursion to the island. A list of plants, with brief notes, is appended to the diary. Sixty-two species of flowering plants, and 13 Filices, are listed, also 34 exotics.

Synonymous with

<i>Dodonæa orientalis</i>	<i>D. viscosa</i> .
<i>Blackburnia pinnata</i> (Forster)	<i>Zanthoxylum pinnata</i> (Linn.).
<i>Elatotostema</i>	Probably <i>E. lignescens</i> .
<i>Sapindus laurinus nitidis</i> .	Probably <i>S. marginatus</i> .
<i>Zieria laurina</i>	Probably <i>Z. aspathaloides</i> .
<i>Morinda macrophylla</i> . . .	<i>M. citrifolia</i> .
<i>Luzuriaga</i>	<i>Geitonoplesium cymosum</i> (A. Cunn.).
<i>Polygonum fruticosum</i> . . .	<i>Atraphaxis lanceolata</i> (A. Cunn.).
<i>Hovea monoica</i>	<i>H. longifolia</i> .
<i>Exocarpus saligna</i>	<i>E. phyllanthoides</i> .
<i>Pittosporum microcarpum</i>	<i>P. eugenoides</i> .
<i>Rugosia</i> (?) <i>Rugelia</i> . . .	<i>Senecio</i> .
<i>Buphthalmium uniflorum</i> .	<i>Wedelia Forsteriana</i> (Forst.).
<i>Hibiscus Patersoni</i>	<i>Lagunaria Patersoni</i> .

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

Part II.

TRIBE 3. ARETHUSEAE. Anther lid-like, incumbent, usually deciduous. Pollen granular or mealy. Terrestrial, or rarely epiphytes. *Stems* in Australian genera *leafless* at the time of flowering.

1. GASTRODIA, R.Br.

Sepals and petals united in a 5-lobed tube or cup. Labellum shorter than the perianth, entire, with 2 obtuse auricles near the base, oblong, the margins undulate (wavy), the disc with 2 longitudinal raised lines or plates, confluent upwards into a single one. Column elongated, with a membranous margin. Anthers lid-like, incumbent. Pollen granular.

Herbs, leafless, not green. Scapes simple and erect, with short loose sheathing scales. The genus extends to New Zealand, Malay Archipelago, Formosa, and Japan. Sometimes recorded as parasitic; but considered by Noel Bernard to be living in association (symbiosis) with a fungus, which stimulates its growth, causing it to grow and flower periodically. The name means a swollen column.

1. GASTRODIA SESAMOIDES, R.Br. "Potato Orchid." Stems from 1 to 3 feet in height, brown, with sheathing scales abundant at base, distant higher up. Raceme erect, up to 6 inches long, having from 2 to 15 or more flowers. Flowers white and brownish, on short pedicels. Perianth $\frac{1}{2}$ inch long. Labellum about as long as perianth, broadly oblong, obtuse and undulate.

Found chiefly in open hilly country, and occasionally in dense forests, especially in moist situations. Recorded from all parts of the State except the N.W.; also from Queensland, New South Wales, and Tasmania. The tall brown stems, crowned with creamy-white and brown flowers, are conspicuous and very beautiful. The tubers are of various sizes, not unlike small potatoes. They do not flower every year. I have gathered the flowers in one season, and in the two following seasons, flowers did not re-appear. The large tubers often break up naturally into smaller ones, which do not flower either till of sufficient size or till stimulated by the fungus.

Plate VII.



DIPODIUM PUNCTATUM, R.Br. Hyacinth Orchid.



Sometimes the stems are somewhat bent over, or even twisted, the flowers hanging downwards at various angles. This appearance has led collectors to consider that there may be two species; but physiologically, both flowers are the same.

TRIBE 4. NEOTTIEAE. Anther erect or bent forward, persistent, but free from the rostellum (beak). Pollen granular or mealy. Terrestrial herbs with simple stems, bearing one or more leaves, rarely leafless, and a single spike raceme or single flower.

To this tribe belong the very large majority of Victorian orchids, all but the six species previously enumerated. They all possess tubers or tuberous roots, and require soil or humic material for their sustenance.

1. CALOCHILUS, R.Br.

Perianth segments free. Dorsal sepal broad, erect, hood-like: lateral sepals broad, acute. Petals shorter than the sepals. Labellum exceeding the other segments in length, sessile, with a triangular lamina, *densely bearded with purple or metallic-coloured hairs*. Column quite short and broad. Anther terminal, with a blunt beak, 2 celled. Pollinia 4 or 2, each deeply bilobed and granular. Terrestrial herbs, with tubers. Leaf solitary, linear, channelled. Flowers few or numerous in a loose raceme.

This is a small genus of orchids, there being only six species; four are endemic to Australia. Two of the Australian species also occur in New Zealand. New Caledonia has a species. Five are found in Australia, four of them being Victorian. The genus is noted for its long triangular and beautifully hairy labellum. The name means "beautiful lip," but a more appropriate one would be bearded-lip.

Recently, in Victoria, a *Calochilus* was found without any hairs on the lip. As only a single specimen was collected, it may only be an aberrant form of one of the species. Should it be found, and in any number, then it will be a new species, and perhaps a new genus.

1. C. PALUDOSUS, R.Br. (belonging to marshes). "Red-beards." Column wing without dark gland on each side near base of column. *Tip of labellum ligulate* (strap-shaped).

Found in N.E., S., and W.

The tip of the labellum is bare, and not unlike a small thin strap end. The hairs on the labellum are purple or purplish brown.

2. *C. ROBERTSONI*, Benth. (after J. G. Robertson, a Victorian botanist). "Brown-beards."

Column-wing with dark gland on each side near base of column. Tip of labellum without ligulate process, *whole surface of labellum hirsute*.

This is the most common Victorian species, being recorded from all districts. Occasionally plants are found very robust and tall. It is perhaps the most robust of the four species.

3. *C. CUPREUS*, Rogers. (Copper coloured bracts and flowers). "Copper-beards."

Column wing with dark gland on each side near base of column. Tip of labellum with ligulate process, labellum not hairy at base. Base of labellum oblong, *glabrous with several raised longitudinal lines*.

This species is recorded in Victoria, only from the Grampians. Its coppery colour is very noticeable. The leaf is shorter and more rigid than in the other species. In section it is triangular, while the others are crescentic. The raceme bears a large number of flowers, from 8 to 15.

4. *C. CAMPESTRIS*, R.Br. (belonging to the fields.) "Peak Beard-Orchid."

Column wing with dark gland on each side near base of column. Tip of labellum with ligulate process, not hairy at base. Base of labellum *smooth and thickened without raised longitudinal lines*.

This species is recorded from the N.E., S. and S.W. In Victoria it is a slender plant, carrying very few, often only 2 or 3, flowers. The bare strap-like end of the labellum is noticeable.

All species of the *Calochilus* are spring-flowering orchids, occurring usually from mid to late spring. They all have a single, robust glabrous leaf, with occasionally small, leaf-like bracts on the stem. They produce abundance of seeds, but, from the comparative rarity of the plants, very few seeds apparently germinate. The tuber is replaced annually, with occasionally an additional one or two alongside.

2. *THELYMITRA*, Forst.

(The name means "wearing a woman's headdress"; referring to the hairy appendages to the hood of the column.)

Sepals and petals (perianth segments) all similar and spreading: *the labellum similar to the other segments*. Column erect, of medium height, and widely winged.

The column wings shortly united in front at the base: produced on each side of the anther into an appendage, sometimes entire, sometimes plumed or decorated with excrescences; commonly produced over and behind the anther, *so as to form a more or less complete, and often bi-lobed hood.*

Terrestrial glabrous herbs, with round, or very often ovoid tubers. Leaf solitary, generally elongated and fluted, rarely wide. Flowers one to many in a terminal raceme. Colour usually in blue shades, sometimes yellow, pink, and red. White or albino forms are occasionally seen.

The species of this genus generally present difficulties of determination, especially to the beginner. The differentiations are found in the form, structure and positions of the various parts of the column, which is very distinct in this genus. The position of the wings of the column, the shape and position of the lobes, the position and even the colours of the hair tufts, and the presence or absence of these tufts are the principal guide features which assist in determining the various species.

As a rule, the flowers require the warmth and bright light of the sun to cause them to expand: hence the name "Sun-Orchids." For photographic purposes, it will often be necessary to stand the flowers close to a bright warm light. They will then open freely.

This is a typical Australian genus, but it is not endemic, as it extends to New Zealand, New Caledonia, and even to Java. Over thirty of the species are endemic to Australia.

KEY TO THE SPECIES.

- A. (a) Column wings produced at the sides of and behind the anther so as to form a hood: the *lateral lobes being pincillate* (bearing hair tufts).

- (b) The hood with 3 short denticulate lobes between the pincillate ones.

Species 1, 2, 3.

- B. (a) As before.

- (b) Hood with 1 entire or bifid (notched) lobe between the pincillate ones.

Species 4.

- C. (a) As before.

- (b) Lobe between the hair tufts bifid or emarginate.

Species 5, 6, 7, 8, 9.

- D. (a) (b) Hood deeply toothed or fringed, *without pencillate lobes*, with a club shaped appendage on the back.

Species 10.

- E. (a) Column wings produced behind the anther, truncate (shortened), not hood shaped, *their lateral lobes not bearing hair tufts*.
 (b) Wings at the back higher than the anther: lateral lobes nearly horizontal, and more or less rugose (roughened).

Species 11.

- F. (a) As in E (a).
 (b) Wings at back *not* so high as anther: lateral lobes *very small*, much exceeded by the *thick* pubescent anther-point.

Species 12.

- G. (a) (b) Column wings not produced behind anther; lateral lobes erect or almost so, and generally as high as the anther.

Species 13, 14, 15.

1. T. IXIOIDES, Swartz. (Ixia-like) "Dotted Sun-Orchid."

Middle lobe of hood shorter than the two others, crested on back: *hair tufts white*. Flowers about 2 to 6, light blue, *the dorsal sepal and petals dotted*. Leaf long, narrow, channelled.

Found in open and scrubby country in all parts of the State, flowering in spring. The dotted flowers form an easy identification. Sometimes pale lavender forms are seen.

2. T. EPIPACTOIDES, F.v.M. (Epipactis-like). "Stout Sun-Orchid."

Middle lobe of hood longer than adjacent divisions, the latter incurved, smooth on back: *hair tufts white*. Flowers greyish green, greyish white, or light brown with a metallic sheen. A strong robust plant, often up to 18 inches in height. Leaf long, fleshy, tubular at base. Stem bracts 1 or 2, quite fleshy and leafy.

Usually found in swampy country. Reported from Cheltenham, Grampians, Ocean Grove, Point Lonsdale and Jan Juc. Flowers in September and October.

3. T. CANALICULATA, R.Br. (channelled, leaf). "Pale Sun-Orchid."

Middle lobe of the hood smooth on the back. Central

lobe of hood broader than in *T. ixioides*, no dorsal crest, and much denticulate.

This is a slender plant, with much paler flowers than *T. ixioides*, the leaf being long and narrow. Found in the S.W., S. and N.E.

4. *T. LUTEO-CILIATA*, Fitz. (Yellow hair tufts.) "Fringed Sun-Orchid."

Lobe between hair-tufts undivided or with crenate margin. Upper border middle lobe convex, crenate: *hair tufts yellow*: flowers pink or light red, usually 2 to 5, opening only in sun.

A slender plant, usually growing freely in colonies. The *reddish colour* and the *yellow hair tufts* are conspicuous guides to the species. The seed pods are unusually large, and possibly the seed germinates freely. Recorded only from Lubeck and Baxter. Flowers in September and October.

5. *T. GRANDIFLORA*, Fitz. (large-flowered). "Great Sun-Orchid."

Crest of middle lobe much higher than hair-tufts, its profile falcate (sickle-shaped). Column erect and high, wings wide and inflated, *hair tufts white*.

A *very robust species*, 15 to 30 inches high. Leaf wide, lanceolate, *thick, sheathing* for several inches at the base. Stem bracts strong, 3 or 4, lower ones leaf-like. Flowers blue or purplish blue, numerous in a long raceme, over an inch in diameter.

Flowers in September and October; recorded from Ringwood, Ocean Grove, Paywit, Marcus Hill, Moorooduc, Point Lonsdale, and Grampians: also from Sth. Australia.

6. *T. ARISTATA*, Lindl. (bearded, i.e., hair tufts). "Scented Sun-Orchid."

Middle lobe of hood dilated, its crest level with the hair-tufts, which are white. Intermediate lobe cup-shaped, dilated, *dark brown* towards the back, *yellow* towards the front, sometimes red-brown, having a V shaped notch in the centre.

A medium stout plant, from 12 to 16 inches in height; leaf sheathing at base, wide, lanceolate, rather flat. Flowers usually *sweet scented, mauve, pale blue, or lavender*, perianth segments elliptical-lanceolate. A fairly common species, flowering all through spring, opening freely in the sun. Recorded from all districts

but the N.W., often very common in the N.E., being found in hundreds, frequently along railway lines. Found in all States except Queensland.

7. *T. MEGCALYPTRA*, Fitz. (Large-hooded). "Lilac Sun-Orchid."

Pencillate lateral lobes of the column wings usually shorter than the middle lobe. Middle lobe quite *yellow*, much inflated; middle lobe not denticulate nor crested, pencillate lobes spreading.

Flowers lilac or pale blue, fairly large, the plant not tall, often not exceeding 1 foot in height. Pink forms are occasionally seen. Recorded only for Grampians; also from New South Wales.

8. *T. LONGIFOLIA*, Forst. (long leaved). "Common Sun-Orchid."

Middle lobe only slightly notched, somewhat tubular, *very dark coloured* except at margin, not dilated as in *T. aristata*. Hair tufts *white*, bent upwards.

A species of variable height, from 9 to 24 inches high; generally slender, leaf often long and quite narrow. Flowers blue, from 1 to 8 in raceme, usually few; not scented. Perianth segments acute. Flowers all through spring, and often found associated with *T. aristata* and *T. ixioides*. Opening freely in sunshine. Recorded from all districts: and from all the other States.

This and the former species are frequently found along railway enclosures in the north-east part of the State, in great profusion. Presumably the abundance is due to the periodic burning off of the grass and plants along the railway line, the orchids being stimulated into bloom.

9. *T. PAUCIFLORA*, R.Br. (few-flowered). "Slender Sun-Orchid."

Hair tufts *white*, turned upwards. Middle lobe *brownish, very deeply and narrowly cleft*, the divisions rounded, entire; crest rather higher than the hair tufts.

Flowers recorded for South Australia as blue, often dark blue, but in Victoria they are usually very pale blue and *often white*. Flowers quite small, one to three on stem, which is slender and from 5 to 9 inches high. Rarely opening except in bright sunshine. Recorded for S., S.W., and N.E., and also from South Australia, New South Wales, and West Australia.

10. *T. FUSCO-LUTEA*, R.Br. (brown-yellow). "Blotched Sun-Orchid."

Column short; wings voluminous.

A stout robust plant, 6 to 18 inches high, with a single *very wide*, ovate to oblong lanceolate leaf, sheathing at base. Flowers 2 to 6, large, *yellowish*, marked with *dark brown* spots or blotches, about 1 inch in diameter.

A Western species, recorded in Victoria only from the Grampians and French Island. Flowers in late spring and early summer, and perhaps on that account, it has been missed in other localities. It is worth searching for, as it is one of our unique and striking orchids. Recorded also from South and West Australia.

See "*Naturalist*" for January, 1921, for illustration.

11. *T. CARNEA*, R.Br. (flesh-coloured) "Pink Sun-Orchid."

Column wings produced behind the anther, laterally, into 2 *denticulate* and more or less roughened *yellow* horizontal lobes, not bearing hair tufts. Intermediate lobe broad, *reddish*. Slightly denticulate and rather higher.

A very slender species, from 6 to 9 inches in height. Leaf channelled, very slender and narrow. Flowers 1 to 3, small, pale pink to bright red, opening only in the sun. Recorded from all districts except the N.W. Often common in grass-land, but inconspicuous except when open. Flowers in late spring. Recorded from all States except Queensland.

12. *T. FLEXUOSA*, Endl. (flexuous, or zig-zag stem). "Twisted Sun-Orchid."

Column erect, not hooded, widely winged, the wings only slightly produced at the sides into rounded dentate lobes. Intermediate lobe slightly notched; all lobes shorter than the anther.

This is a very slender plant, with wavy or zig-zag wiry stem, having a small almost terete leaf. Flowers small, 1 to 3 on stem, yellow, opening only in very warm sunshine, and then only for a short period. Height about 6 to 8 inches.

Fairly abundant in grass lands, and recorded from all parts except the N.W. It is an insignificant plant, and often is passed unnoticed, owing to its usually unopened flowers. Found also in South Australia, Tasmania, and West Australia.

13. *T. ANTENNIFERA*, Hook.f. (bearing antenna). "Rabbit-ears."

Lateral lobes smooth, *reddish brown*, emarginate,

higher than the anther. Column not hooded, broadly winged.

Not to be confused with the preceding species, this species being stouter and larger flowered. *Leaf terete*, longer than in Species 12. Flowers 1 to 3, rich yellow, with a brownish stripe on the outside: very sweetly scented, and opening more freely in sunshine than the previous species. A *red variety* has been recorded.

The unusual brown appendages produced by the wings, which look like the antennae of an insect, have given occasion to the common name, "rabbit ears." It is recorded from S.W., S., and N.W. It really should be collected in other districts; for it is fairly abundant, and is found also in South Australia, Tasmania, and West Australia.

14. *T. MACMILLANII*, F.v.M. (after Thos. Macmillan). "Salmon Sun-Orchid."

Lateral lobes of column *denticulate*, *yellow*, much higher than the anther. Leaf narrow linear, 2-4 inches long; stem slender, tough and about 6 inches high. Flowers opening freely, 1 to 4 on stem, *salmon-red* in colour.

The colour of this species distinguishes it from all others, although it must not be confused with *T. fuscolutea*. In the latter species, the yellow hair tufts distinguish it, also the smaller flowers. This species also should not be mistaken for the red forms of *T. antennifera*. This latter species has the unmistakable "rabbit ears," which do not occur in *T. Macmillanii*. Recorded from the S. and S.W., chiefly near the sea-coast; also from South Australia.

T. VENOSA, R.Br. (veined, referring to the perianth segments). "Veined Sun-Orchid."

Lateral lobes *spirally involute*, neither rough or ciliate. Column erect, winged, but not hooded.

Flowers large, blue, the thin perianth segments *distinctly veined*. The labellum generally more marked, being more rounded than the other five segments. Leaf narrow, channelled; stem from 6 to 12 inches high, bearing 1 to 5 or more flowers.

This is usually an alpine plant, being abundant on the Baw Baws. It has not been recorded from the lower levels. Found also in South Australia, New South Wales and Tasmania.

THE GENUS *SPICULAEA*, LINDL., AND ITS TAXONOMIC RELATIONSHIPS.

BY R. S. ROGERS, M.A., M.D., F.L.S.

(Communicated by E. E. Pescott, F.L.S.)

This genus was established by Lindley in his *Swan River Appendix*, p. lvi. (1839), and was very properly separated by him from another of his Western Australian genera, *Drakaea*, which he published at the same time. It was then represented by a single species, *S. ciliata*, Lindl.

Nearly 20 years later, Baron von Mueller described a Queensland plant of similar habit; but, inasmuch as this differed from the Western species in the mode of attachment of the labellum to the column, a feature which Lindley had regarded as of generic importance, it was placed by the Baron in a new genus, which he called *Arthrochilus*. Subsequently Reichenbach, f. removed both these genera to Lindley's genus *Drakaea*. As Reichenbach's view was, unfortunately, accepted by Bentham, these plants secured an authoritative position as members of the latter genus in the *Flora Australiensis* and the *Genera Plantarum*. Although I have long looked askance at this unnatural relationship, it has remained for the German orchidologist, R. Schlechter, to disrupt it, and to reinstate Lindley's genus *Spiculaea*. If *Spiculaea* is to be included in *Drakaea*, it has always appeared to me inconsistent to exclude *Caleana*, Br., which seems to bear to it an even still closer relationship.

Schlechter has, very wisely, placed these three genera, together with *Chiloglottis*, R.Br., in a new group, which he calls *Drakaeinae*. This dislodges *Pterostylis*, Br., from the position very illogically assigned to it by Pfitzer, next to *Drakaea*. The order of sequence in the above group, which I hope Australian botanists will accept, is as follows: 1. *Caleana*, R.Br.; 2. *Drakaea*, Lindl.; 3. *Spiculaea*, Lindl.; 4. *Chiloglottis*, R.Br. This makes an easy and natural transition to the next group, viz., that of the *Caladeniinae*. As regards habit, the resemblance between the first three members of the group is undoubted, and especially is it striking between *Caleana* and *Drakaea*, in which the stem, perianth and fundamental characters of the labellum, are almost identical. The fourth member, *Chiloglottis*, forms the connecting link between the two groups mentioned, in a

satisfactory manner, which could not possibly be expected from *Pterostylis*, in which both vegetative and floral characters are so very remote.

For divisional purposes the structure of the column and other features mentioned below, may be usefully employed.

1. *Caleana*, R.Br. Column conspicuously and widely winged throughout; usually with a definite foot. Leaf single, basal, elongated. Stem wire-like, stem-bracts (not including floral bracts) absent or single. Flowers one or more, *reversed*.
2. *Drakaea*, Lindl. Column wingless, except for a single, blunt, somewhat triangular auricle on each side; foot very conspicuous. Leaf single, basal, rounded, more or less orbicular. Stem wire-like, bract single. Flowers one, erect.
3. *Spiculaea*, Lindl. Column wingless, except for two acute subulate or falcate auricles on each side; foot usually conspicuous. Usually leafless at the time of flowering. Stem more or less fleshy, never wiry, stem-bracts more than one. Flowers multiple, sometimes *apparently reversed*.
4. *Chiloglottis*, R.Br. Column moderately winged throughout; footless. Leaves two, basal, well developed, elongated. Stem always fleshy, no stem-bract. Flowers single, erect.

I believe that the following circumscription will exclude all other members of the group, at the same time being sufficiently wide to include Eastern species of the genus.

SPICULAEA, Lindl.

Segments of the perianth narrow, somewhat similar, the dorsal one erect, the others more or less spreading or reflexed. Labellum articulated by a slender elongated claw, either almost directly to the base of the column, or to the apex of its elongated foot; lamina narrow, peltate, hammer-shaped or insectiform, the upper lobe simple emarginate, or divided into two long divergent filiform tails. Column elongated, slender, incurved, erect, or reflexed towards or against the ovary; provided on each side with two subulate or falcate auricles in its upper part; foot absent, very rudimentary, or produced into a long process which articulates with the claw of the labellum. Anther erect, bilocular, quite blunt. Rostellum rudimentary, unconnected with anther.

Small delicate terrestrial herbs, with underground tuber, generally leafless at time of flowering. Scape with more or less fleshy, never wiry stem, and two or more stem-bracts. Flowers about 2-8, racemose.

The genus readily lends itself for division into two sections, characterised as follows:

§1. Column-foot absent or rudimentary; upper lobe of labellum narrowly elongated, simple, undivided.
EU-SPICULAEA.

§2. Column-foot conspicuously elongated; upper lobe of labellum simple and shortly pointed, or produced into two elongated divergent filiform tails.
ARTHROCHILUS.

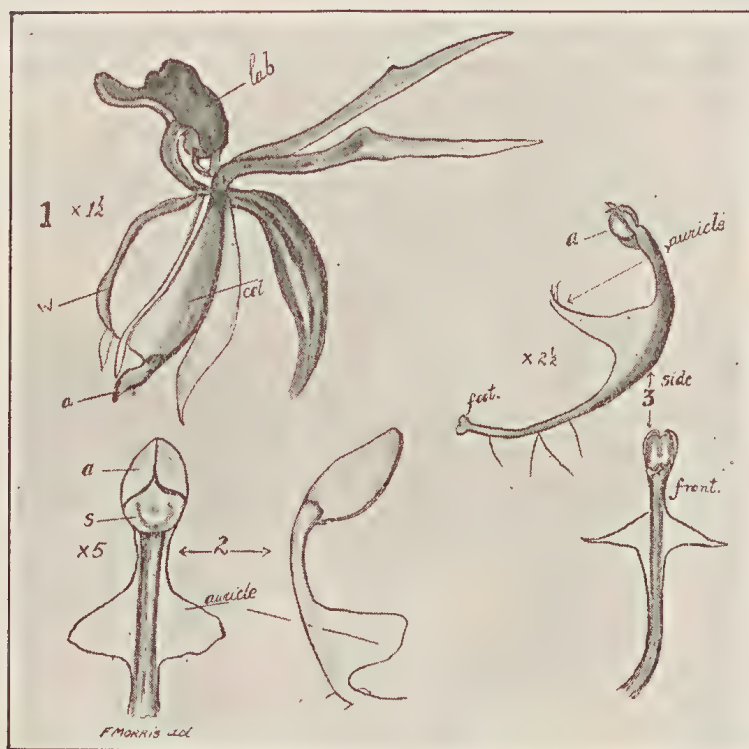


Fig. 1, *Calceana major*, R.Br. Fig. 2, *Drakaea glyptodon*, side and front of column. Fig. 3, *Spiculaea irritabilis*, side and front of column.

The first of these is represented, up to the present, by an isolated Western species, *S. ciliata*, Lindl., which has a single, basal, elongated leaf, withered or disintegrated at the time of flowering (November). The second has two known representatives in the Eastern States, viz., *S. irritabilis* (F.v.M.), Schltr., n. comb., and *S. Huntiana*, (F. v. M.), Schltr., n. comb. These are both

summer forms and both are leafless at the time of flowering, although in the case of the first, a rosette of two or three elliptical ovate or oblong leaves is occasionally found at or near the base of the scape. So far no information is available regarding the leaf-system of *S. Huntiana*.

These three species agree well in habit, but in the case of the Eastern species a great degree of retraction is to be observed in the column, this structure being retracted at right angles to the ovary in one case and actually reflexed against it in the other, in both instances causing the flowers to appear reversed. In the Western species the column is erect, thus giving the flowers a normal attitude.

A differential table is appended, indicating the chief distinguishing characters of the published species.

Labellum articulated by claw, either directly to base of column or to apex of its very rudimentary foot. Column erect on ovary. Leaf basal lanceolate or ovate-lanceolate, withering off at time of flowering *S. ciliata*.

Labellum articulated at apex of elongated foot of column. Leafless at time of flowering, but rosette of leaves sometimes found near base of scape.

Column retracted at right angles to axis of ovary. Dorsal sepal greatly exceeding other segments. *S. irritabilis*.

Column reflected against side of ovary. Segments of perianth about equal in length. *S. Huntiana*.

A Western species of this genus is figured by Lindley in the Swan River Appendix, page lv., t. 4. An Eastern form, *S. irritabilis*, will be found illustrated in Reichenbach's *Xenia*, II., t. 189, and the third known species, *S. Huntiana*, by me in *Tr. Roy. Soc. S. Australia*, XLII., 1918, page 32, t. 4.

Distribution. Much remains to be learnt with regard to the distribution of these remarkable little plants. Apparently, only one species, *S. irritabilis*, penetrates the tropics. This is a coastal plant, with a considerable range along the east coast of Australia, extending from Rockingham Bay (latitude 18 degrees), to Moreton Bay, in Queensland, and Newcastle, in New South Wales, to Eastern Victoria. No specimen from a Victorian locality is included in the Melbourne Herbarium. It blooms in the late summer months of February and March.

S. Huntiana, so far as is known, is more restricted

in its range, and is by preference a mountain dweller. It was first recorded from Mt. Tingiringi (5,000 feet), in New South Wales; and later from Blackheath (3,500 feet), in the Blue Mountains. In 1917 it was discovered in Victoria, at Cravensville, by that ardent orchidologist, Mr. A. B. Braine. I notice that its author, Baron von Mueller, refers to it as an autumnal plant, but all plants received by me from Cravensville (and they have been fairly numerous) bloomed in November and December. *S. ciliata*, Lindl., is only known to me from two localities in Western Australia, viz., York and Swan River, both places at low altitude in the South-west corner of the State.

Thus, the curious fact is revealed, that the entire breadth of the continent (some 2,400 miles) intervenes between the easterly and westerly representatives of this genus, with up to the present, no records of intermediate forms to bridge this vast distance. It is of course possible, that a distributing centre may yet be discovered to the North, in Malaysia or Papuasias, but even then, such a discovery would leave many pertinent questions unanswered.

REPRINTS FOR AUTHORS.

The Committee, at its last meeting, considered the question of reprints of papers published in the *Naturalist*. The cost of reprints is considerable in the course of a year.

It was decided that, in future, 25 reprints (without covers) be supplied to the author of any technical paper, or one containing original records, etc.; and that authors of articles of general interest, should receive up to six free copies of the *Naturalist*, at the discretion of the Publishing Committee.

Authors of scientific papers who require reprints, are asked to notify the Secretary when submitting such papers for the Committee's consideration.

The Editor requests that contributions intended for publication in the *Naturalist*, should be typewritten, if possible; otherwise that they be written very clearly (on one side of paper only), and with proper spacing between lines. Crowded writing is very troublesome to type-setters, and often leads to errors.

During August, 1925, at Lilydale, I had a nest of the Mountain Thrush (*Oreocincla lunulata*) under observation for some weeks. Eventually a young bird was hatched, and seemed to thrive well for nearly a week. Revisiting the nest after an interval of two days, I was surprised to find that the fledgling had disappeared. Presently a fox calmly passed by within eight yards of me. The possibility of this animal being the culprit then occurred to me, and on the ground at the foot of the bush I discovered evidence of it having been there. As the nest was at a height of only 5 feet, in a thick Tea-tree, whose branches reached to the ground, the fox would find little difficulty in reaching it.—D. DICKERSON.

AROUND THE YAN YEAN.

BY A. E. RODDA.

(Read before the Field Naturalists' Club of Victoria,
September 13th, 1926.)

On January 2nd last, a visit was paid to Yan Yean Reservoir. Proceeding along a road east from Whittlesea, our objective was a pine-clad ridge abutting on the north-eastern portion of the lake, and forming the nearest prominent landmark. Two small, murky creeks were passed at about half a mile from the township. One, visibly flowing, was the Plenty River. In justice to the Plenty, it should be stated that the bulk of its waters has been diverted to the Yan Yean some miles upstream.

The intake channel, constructed of blocks of dressed basalt, and half full of clear, dark-colored water hurrying on its way from the adjacent hills, was next crossed. Topping a steep slope to the pine ridge, we looked upon a deep valley, the main natural feeder to the basin from the north, and, at its southern end, bordered by a vivid green fringe of reeds and rushes, we gained our first view of the extensive blue waters of the Yan Yean. Approaching the margin, certain moving black dots on the water resolved themselves into swans, ducks, and other aquatic birds.

Across the valley the ground rises into a fine plantation of pines, and in their dense shade the next two miles were covered pleasantly, with the clear waters always close at hand on the right. In places the pines, which are mostly *Pinus insignis*, are intersected by fire-breaks, about 30 yards in width, and occasionally give place to small plantations of *Pittosporum*, Acacias, and native pines (*Callitris*). Many of the latter have sprung up as seedlings, and are graceful, sturdy little trees, from 3 ft. to 6 ft. in height.

The plantations always border the steeper slopes to the water, where, in most places, an apron of basalt spalls has been laid down, to reduce erosion. These spots are the favorite roosting-places of cormorants, for, on the tops of posts driven into the water, and also on fence-rails lining the margin, are dozens of spring traps, set ready for action. A ghastly collection of the remains of these ravenous fish-eaters was found in a thicket—a score or more decaying bodies of the Pied

species, each with the upper mandible removed, as a token for the reward for destruction. In spite of the war upon them, cormorants still are numerous. A large flight of about 30 alighted in the water half a mile from shore, with an audible splashing. The glass revealed them to be the large black species (*Phalacrocorax carbo*), which has an almost world-wide distribution. Cormorants generally are considered to be silent birds, but the chorus of harsh croakings that greeted new arrivals showed that they can be vociferous.

Grazing not being permitted in the extensive reserve surrounding the reservoir, the grass is thick and matted. Evidence of rabbits was everywhere, and many were seen; but they appear to have made hardly any impression on the ground vegetation.

The pine plantation ends at an abrupt slope, overlooking another bay thickly overgrown with semi-aquatic vegetation. The tall pines on this point are the haunt of a number of Swamp Harriers (*Circus Gouldi*), and six of these large hawks were disturbed from one tree. As they glided over the marsh on widespread wings, the coots and waterhens, with shrill cries of alarm, rushed for cover beneath the dense growths. An attempt to take a short cut across this valley was soon abandoned, as the dead and living vegetation formed a crust above the damp slippery soil, and walking was too laborious. Accordingly, a detour was made round the head of the swamp, through open grassy land, where a hare was put up, and a pair of Kestrels (*Cerchneis cenchroides*) noted, hovering high in the blue.

On the further side, where the ground rises again, another plantation was entered. This consists mainly of Eucalypts, Acacias, and a few Casuarinas. The Eucalypts are mostly Blue Gums (*E. globulus*), and, as is customary with them in an uncongenial situation, many are in a dead, or half-dead condition; but the aspect is relieved by the presence of numerous self-sown saplings, in their delicate shades of bluish grey.

The birds of the Eucalypts were somewhat different from those observed in the pines. In and around the latter, Magpie Larks (*Grallina cyanoleuca*), Night Herons (*Nycticorax caledonicus*), Magpies, and Harriers predominated, while in the former, Honeyeaters of several kinds, the Black-faced Grauculus (*Coracina robusta*), Tree Creepers (*Climacteris*), Whistlers

(*Pachycephala*), and a host of smaller birds were noted. A pair of Restless Flycatchers (*Siesura inquieta*) arrested attention by their amazing vocal efforts. Harsh to a degree, their rasping rattling notes were most unbirdlike.

Turning towards the margin of the lake, a sudden commotion in the water revealed a large school of Perch, that had come so close inshore that their dorsal fins projected above the surface as they struggled towards deeper water. Our pause here also brought under notice an unusually large company of Musk Ducks (*Biziura lobata*). Twenty-four were counted as they quietly, but speedily, made for safer depths. With them were several Crested Grebes (*Podiceps cristatus*), and some lesser kinds, including the Hoary-Headed species (*P. poliocephalus*.) A few Dotterel ran briskly over the single, and at a distance a white bird (probably a tern) in flight, was seen indistinctly against the dark foliage of the further shore.

Another swampy valley was rounded, and another pine plantation entered. The pines being closely planted, are tall and straight. The topmost branches, almost meeting, form a perfect shade, where one is tempted to linger on a hot day.

A small clearing near here is partly overgrown with the dwarfed trees and shrubs of the Cherry Ballart (*Exocarpos*). On these were found many caterpillars of the Imperial White Butterfly (*Delias aganippe*). Some of these, preparatory to pupating, had spun a girdle of silk around their middles, to attach themselves to the plant-stalk. Others, completely pupated, were attached by the tail, and showed contrasting colors of dark brown and creamy-white. While observing these, we discovered that we were standing on the gravel-strewn nest of an aggressive colony of red ants, that were converging towards us on every side. By moving to different points around the nest the direction of advance of the ants was altered. One cannot but admire the reckless courage of these small defenders of their homes, as they unhesitatingly rush in against overwhelming odds.

Close by a swarm of winged termites was emerging from a decayed stump. Some of the small, yellowish workers had stationed themselves at the exit holes and appeared to be preventing the imagoes from re-entering. Wood Swallows in the air, and little slate-colored lizards

Plate VIII.



RED-LINED DOTTEREL, *Erythronyx cinctus*, on Nest.

Photo by R. T. Longdon



on the ground, took a toll from this exodus. If the lizards fancied red ants they could get their meals more easily than by waiting for fallen termites.

Soon we arrived at the long dam-wall spanning the next valley. From here an artificial waterfall leads into the outlet channel, which stretches away almost to invisibility in a straight line towards the metropolis. We took the dusty road to the Yan Yean railway station, having encircled two-thirds of the reservoir, which, with its blue waters, pine-clad hills and green, watery valleys, is one of the most interesting and picturesque localities within easy reach of the city.

A notable feature of this spring has been the early appearance of some migratory birds around Melbourne. The nesting season, too, commenced much earlier than in many previous years. Though the Olive-backed Oriole (*Oriolus sagittatus*) usually arrives here in October, two birds were heard calling at Mooroolbark on September 12th, while on August 29th an Australian Snipe (*Gallinago hardwicki*) was flushed from the tussocks in a swamp along the Olinda Creek. The Black-faced Cuckoo-Shrike (*Coracina novae-hollandiae*) nested unusually early; a nest with two eggs was found on September 12th, at Mooroolbark, and others in process of building were noticed in the box trees nearer to Melbourne.

—D. DICKERSON.

This spring has been a very interesting one as far as orchids are concerned, and many varieties have come to hand. A recent visit to Airey's Inlet (Rev. A. C. F. Gates, Leader) revealed the rare fleshy-lip *Caladenia*, *Caladenia cardiochila*, Tate, in considerable numbers, in the timbered country bordering the coast, also a few plants of another rarity, in hard stony ground, close to Anglesea—the specific name of this orchid is doubtful, but it may ultimately prove to be the rare blotched sun-orchid, *Thelymitra fusco-lutea*, R.Br.; a budded specimen was removed, and is now growing well.

The Hooded *Caladenia*, *Caladenia cucullata*, Fitz., has been received from Rushworth, Victoria (Mrs. Edith Rich). This is a notable find, and the specimens are exactly as Fitzgerald figured the species in *Australian Orchids*. The dwarf *Caladenia*, *Caladenia pumila*, Rogers, has been sent from Bannockburn, Victoria, by the original discoverer of the plant (Miss Pilloud). This "great white spider" is a glorious type. Another fine orchid from the same collector is the Salmon Sun-orchid, *Thelymitra Macmillanii*, F.v.M.

—W. H. NICHOLLS.

Botany has always received ample space in the *Naturalist*, and now it is proposed to give ornithology a larger share than it has had hitherto. Members who are interested especially in birds, are invited to contribute field notes, and to submit photographs for consideration. The photograph reproduced in this issue, it is hoped, will be the first of many illustrations appealing, not to bird lovers only, but to all club members.

AUSTRALIAN THRIPS.

Up to 1914 very few species of Australian thrips were known. In June of the present year 135 species, comprised in 50 genera, had been described. Other forms are being studied. Many of the native species are attacking cultivated plants. I have taken several species in the Botanic and other gardens in and around Melbourne. Thrips of other countries are being introduced. In 1915 I took the European species, *Limothrips cerealium* (Hal), on wheat at Sydenham. There are several other instances of introduction, but far the greater number of species are endemic.

Mr. A. A. Girault, of the Agricultural Department at Brisbane, sends me the following note: "*Chirothrips Manicatus* (Haliday). This is the first Australian record of a well-known grain-insect. In the collection of the Department of Agriculture and Stock, I found a female labelled 'Thought to be associated with grain, Brisbane, February 27, 1912, Tryon.'" He also writes me about *Pseudanaphothrips achaetus* (Bagnall), which was originally described by Bagnall in 1914, as *Pseudothrips*, Mt. Lofty Ranges, South Australia, from (3) females. The co-types are in my possession. In 1918 Bagnall secured a male from Cottesloe Beach, Fremantle, Western Australia, and gave a further description in the *Annals and Magazine of Natural History*; and recorded females from the Blue Mountains, New South Wales.

The following is Girault's note: "Karny reported this species from the far north of Queensland (Mjoberg's expedition), and I have just turned up the following records:—A female, Bakerville, forest, March 15th, 1919 (light specimen). A male, nine females on strawberry flowers, Manly, Sept. 24th, 1924 (H. Tryon). Two females, strawberry, Beerwah, October 9th, 1920 (H. Tryon). A female, lantana flowers. Dec. 16th, 1925. Two females, flowers glycine tobacina, November 9th, 1925. One male, Wellington Point, flower strawberry. Localities in Queensland. Thus the species has spread to cultured and introduced plants. Nearly all the specimens were blackish, thorax sometimes reddish, antenna 3 and fore tibia pale."—REGINALD KELLY.

The Secretary of the International Commission on Zoological Nomenclature notifies that a new (English) edition of the *International Rules*, together with the summaries of "Opinions," 1 to 90, has been printed in the *Proceedings of the Biological Society of Washington, D.C.*, Vol. 39, pp. 75-104, July, 1926. Copies can be obtained from the Secretary of the Society. (Address: Bureau of Entomology, U.S. Dept. Agriculture, Washington, D.C.) Price, \$1.00.

CHARLES HEDLEY.

Science has lost one of its most devoted and distinguished sons in Australia, by the death of Mr. Charles Hedley, F.L.S. And we, who knew him, have lost a friend, learned, of charming manner, and always modest in regard to his notable achievements.

Had Mr. Hedley elected to become a man of letters instead of a student of conchology and corals, he would have won in literature a place as high as that which he gained as a naturalist. His popular writings, all too few, are far above the average; for Mr. Hedley had a sense of style as well as abundant knowledge. Often he was urged to write a book of his wanderings, as student and collector. And, smiling, he would say it might be undertaken in the years of leisure.

As a conchologist, Mr. Hedley's fame is secure. He earned a world-wide reputation by his studies of Australian mollusca; but in recent years, his attention was devoted mainly to coral reef problems. He joined the Australian Museum staff under John Brazier, F.L.S. Upon the latter's retirement, Mr. Hedley succeeded him, as conchologist, and during the following thirty years he published very many papers, well illustrated, mostly by himself, describing new species of mollusca. He was Past-President of the Linnean Society of New South Wales, the Royal Society of N.S.W., and the Royal Zoological Society of N.S.W., Honorary Fellow of many other Australasian Societies, and a member of our Club. (He contributed to the "*Naturalist*.") He went with the Royal Society of London Expedition to examine the Funafuti Atoll, and reported on its molluscan fauna. He also reported on the mollusca collected by the British Antarctic Expedition, 1907-9, and subsequently on the mollusca obtained during the Australasian Antarctic Expedition, 1911-1914.

Mr. Hedley died at his residence, Mosman, N.S.W., on September 14th, he had been invalided from his work as Scientific Director of the Great Barrier Reef Investigations Committee, a position which he accepted after retiring from the Australian Museum, where he was Chief Keeper of the Collections. He was born at Yorkshire in 1863.

INTRODUCTION OF BRITISH BIRDS.

Blackbirds, skylarks and thrushes have become familiar birds in the Melbourne district, and the two first-mentioned in many country places. They are accepted almost as natives now, and indeed, some people may not even know that they are introduced species. Recently, Dr. G. C. Nicholson, D.D.Sc., of Melbourne, sent me some interesting notes regarding the coming of British birds to Victoria. The alien songsters of our parks and gardens, are, he states, descendants of birds that were liberated by his uncle, the late Dr. George Nicholson, of Ballarat.

"One morning in August, 1876," Dr. G. C. Nicholson writes, "my uncle took me for a drive beyond Wendouree. He told me that I would soon see some prisoners released from captivity, and my feelings were hardly enthusiastic at the information, as I was only a small boy, and at this time bushrangers were much in evidence. My uncle, however, was in great spirits as we neared the rendezvous, where two of his menservants were in charge of the 'prisoners.' There were five or six large boxes, with wire in front, containing blackbirds, thrushes, and skylarks. This was the *third* consignment of birds that my uncle was instrumental in bringing out from Britain. The first he imported at his own expense, from Ireland, in 1867. The second lot arrived in 1870 or 1871.

"The birds of the third lot, as in previous consignments, were obtained principally from County Cork. Some, however, were captured near Dublin. Dr. Stewart, of Smythesdale, a friend of my uncle, shared the expense in connection with this importation. The birds were liberated at about 11 o'clock. The day was bright and crisp, and when Dr. Stewart arrived, he gave the signal and the doors were opened. It took quite a long time, nearly two hours I think, for the feathered prisoners to come out. I remember how timid they were. One little thrush could not fly at all, and had to be taken back to my uncle's aviary. There was a clump of trees nearby, but the birds kept hopping along the ground for a distance. About a quarter of a mile from this place was a large dam, called the Little Lake, surrounded by trees.

"In 1867 my uncle took home to Ireland, wallabies and magpies and some other birds, which were kept at our house at Castletown, Beechaven, County Cork, to the great discomfort of our family, so my mother told me.

Dr. Nicholson eventually gave both wallabies and birds to the Dublin Zoological Gardens. He was a great lover of birds, and when sparrows were imported he had a little cot erected near his stables to encourage them to nest."

Dr. G. C. Nicholson's uncle was an old cavalry surgeon, and in the early days was known by his army title, Surgeon-Major George Nicholson, later of the Prince of Wales' Light Horse. He guarded his bird friends, and on one occasion chased two boys who had been detected in a shangai offensive against the sparrows. Buggy whip in hand, and coatless, the doctor raced down Albert Street, Ballarat, after the lads, both of whom were to become noted citizens. One was captured and soundly whipped.—C.B.

CHECK LIST OF AUSTRALIAN BIRDS.

"The Official Checklist of the Birds of Australia" (second edition), has now been published—its preparation was begun in 1915. To every one who is interested in our avifauna, it is indispensable. The number of species recognised by the Check List Committee, is 707; but the sub-species, included as synonyms, are very numerous, and many of them are merely geographical varieties, and need not concern the field naturalist, whose views often differ widely from those of the systematist.

A most interesting and valuable appendix, by Mr. H. Wolstenholme, B.A., deals with the scientific names of our birds. Notes on the names are given, also a vocabulary, and suggested pronunciation in syllables. This section of the List may be read through with both profit and pleasure; and should a second edition of the "Census of the Plants of Victoria" be called for, a similar appendix might well be prepared, for the benefit of wild flower lovers, who may not know the meanings of scientific names.

HUMMING BIRD AND BLUE GUM FLOWERS.

Mr. P. R. H. St. John, who forwards the following excerpt from an American journal, says that he knows of no Australian bird that uses the stamens of Eucalypt blossoms as nest-material:—

"I will here speak of Allen's Humming Bird (*Selasphorus alleni*) that commenced to build its nest on a rose, under the porch, and within 8 feet of the floor, in front of our bedroom window, on May 27th. She commenced the nest on the end of the stalk, by bringing a lot of willow cotton and webs. She would place herself on the spot chosen, then with her bill, running it here and there around the edge of the bottom, picking out a bit here and there to place some other in its place, then working her wings in a fluttering manner to shape the nest around her body. On May 31st she laid her first egg, although the nest was not all done yet. . . . Once or twice she left the nest to get a bit of web or cotton to put around the nest. On June 1st she did not lay an egg, as the wind was blowing hard all day. So she had to keep on her nest to save her egg. The nest looked about half done, a great deal of cotton from the willows and the stamens of the Australian Blue Gum flowers were used for lining the inside of the nest."—(W. O. EMERSON, *Ornithologist and Oologist*, Vol. XI., No. 3, p. 37).

SOME VICTORIAN LIZARDS.

Few additions to the List of Victorian Lizards are likely to be made, though the Mallee country and our Alpine region may yield some varieties of familiar species. The chief work to be done in this field, is not collecting, but observation of habits. We know little regarding the life histories of these attractive creatures. Begin to write a biography of any species, and you find that the material is scattered and scanty. No one, apparently, has made intensive studies in the field, of even our commonest lizards.

My own observations on lizards have been made too casually; but some species I have kept in captivity, and, watching their ways, have thought that it would be delightful to study lizards in their natural haunts, as birds are studied. More difficult it would be; but the results might be of great interest and value.

In the Mallee, at Murrayville, in October, 1925, I captured, among other species, an immature example of the Painted Dragon, *Amphibolurus pictus* (kindly identified for me by Mr. J. A. Kershaw). It was lurking under a log in a moist spot near a dam, and became lively as soon as sunlight touched it. Fawny yellow and brown, with dark markings, it was, in coloration, quite unlike the splendid figure of the species given in the *Horn Expedition Report* (Zoology, Pl. X., Fig. 1). There is much variation in the coloration of this, and many other species, but on the fringe of the "Desert," in North-Western Victoria, one might expect to find Painted Dragons gay in brick-red, yellow and blue, or showing signs of colour beauty even in youth. My captive was docile, and a photograph was obtained easily.

From Murrayville I brought home a Stump-tailed Lizard, *Trachysaurus rugosus*, and made it a tenant of the garden. It soon wandered, and was captured in a neighbour's garden. Again it disappeared, and three days later was discovered a fair distance from "home," among Mallee roots in a yard. Returned to me, it was given freedom of the suburban "estate," but within a week was missing, not to be found again. With other Stumptails, my experience has been similar: these reptiles are slow upon their ways, but wander they will, given the opportunity.

Several species of the little, metallic-coloured lizards of the genus *Liolepisma*, have been liberated in my garden; and sometimes I see one basking on the gravel, beautiful in tints of purple, brown and green. I have had them on my writing desk in the study, gliding about the polished wood, unafraid, and even friendly. They are dainty and graceful; desirable as any "queer pets" known to me.—CHARLES BARRETT.

Field Naturalists' Club of Victoria

OFFICE-BEARERS, 1926-1927.

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(Tel. Canterbury 2751.)

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F. CHAPMAN, A.L.S.; C. DALEY, B.A., F.L.S.; J. A. KERSHAW, and
V. Miller.

EXCURSIONS.

SATURDAY, OCTOBER 9.—Yarra Junction. Object: **Ochids.**
Leaders: Messrs. E. E. Pescott, F.L.S., and C. French, Junr.
Meet at Flinders Street Station for 8.21 a.m. train. Lunch
to be taken.

SATURDAY, OCTOBER 16.—Frankston. Object: **Botany.**
Leader: Mr. J. W. Audas, F.L.S. Meet at Flinders Street
Station for 1.10 p.m. train.

SATURDAY, OCTOBER 23.—Eltham. Objects: **Birds.** Leader:
Mr. W. Tonge. Meet at Prince's Bridge Station for 1.20 p.m.
train.

SATURDAY, OCTOBER 30.—Geelong. Object: **Batesford Quarries**
(Geology, etc.) Leader: Dr. G. McCallum. Meet at Flinders
Street Station for 9 a.m. train.

TUESDAY, NOVEMBER 2 (CUP DAY).—Hurstbridge. Object:
General. Leader: Mr. A. J. Tadgell. Meet at Prince's Bridge
Station for 8.4 a.m. train. Lunch to be taken.

SATURDAY, NOVEMBER 6.—Tooradin. Object: **Botany.** Leader:
Mr. H. B. Williamson, F.L.S. Meet at Flinders Street Station
for 6.50 a.m. train. Lunch need not be taken. Names of
members intending to participate should be handed to Leader
at October meeting.

SATURDAY, NOVEMBER 13.—Organ Pipes and Bulla. Object:
Geology. Leader: Mr. A. L. Scott. Leave Melbourne (opp.
Gas Offices, Flinders Street) by char-a-banc at 1.10 p.m., and
arrive back between 7 and 8 p.m. Provisions for one meal
to be taken. Leader will provide tea, sugar, milk and billy.
Names must be in Leader's hands not later than October meet-
ing, otherwise seats cannot be guaranteed. Minimum twelve.
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NOVEMBER, 1926.



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THE JOURNAL AND MAGAZINE

— OF —

The Field Naturalists' Club of Victoria

Published 5th November, 1926

Hon. Editor: CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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1926

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V. Miller.

EXCURSIONS.

SATURDAY, NOVEMBER 13.—Organ Pipes and Bulla. Object: Geology. Leader: Mr. A. L. Scott. For particulars, see October *Naturalist*. Bring hampers and cups for evening meal. (Leader providing tea and milk.) As applications exceed seating accommodation, those who have handed in names are requested to obtain tickets from the Leader at the November meeting (or at A.M.P. Society Office, Collins St.) in order to ensure their seats being available. Fares:—Members, 3/6; non-members, 5/-.

SATURDAY, NOVEMBER 20.—Healesville. Object: Orchids. Leader: Mr. E. Coleman. Meet at Flinders Street Station for 8.21 a.m. train. Lunch to be taken.

SATURDAY, NOVEMBER 27.—Millgrove. Object: Botany. Leader: Mr. H. B. Williamson, F.L.S. Meet at Flinders Street Station for 8.21 a.m. train. Lunch to be taken.

SATURDAY, DECEMBER 4.—Bayswater. Object: Grasses. Leader: Mr. P. F. Morris. Meet at Flinders Street Station for 1.30 p.m. train.

SATURDAY, DECEMBER 11.—Yan Yean. Object: General. Leader: Mr. A. E. Rodda. Meet at Spencer Street Station for 8.50 a.m. train. Lunch to be taken.

XMAS EXCURSION,—DECEMBER 27th to JANUARY 3rd.—Mitchell Gorge, via Fernbank. Object: General. Camp-out (men only). Approx. cost £5 per head. Names must be handed in at November meeting to the Leader (Mr. C. Daley, F.L.S.), as the party will be limited to 8.

WILD FLOWER SHOW TICKETS.

Members who have not yet paid for tickets used at the Wild Flower Show are requested to settle for these at their earliest convenience.

The Victorian Naturalist

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NOVEMBER 5, 1926.

No. 515.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, October 11, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair; and about 65 members and friends were present.

CORRESPONDENCE.

From Combined Progress Associations of Shire of Fern Tree Gully, assuring the Club of their support and co-operation in the movement towards the proclamation of the Dandenong State Forest as a National Park.

From Victorian Bush Nursing Association, notifying the election of Miss E. H. Gabriel and Messrs. Geo. Coghill and F. Pitcher, as life-members of the Association.

REPORTS.

Reports of excursions were given as follow:—Royal Park, Mr. R. E. Luher, B.A.; Mornington, Rev. G. Cox; Ringwood, Mr. F. E. Wilson; Balwyn (Maling's Quarry and "Maranoa" Garden), Mr. L. L. Hodgson. Mr. E. E. Pescott stated that the Yarra Junction excursion on October 9 had been abandoned owing to unpropitious weather.

Mr. C. Daley reported on the visit to Belgrave on September 18 to attend the Conference regarding Sherbrooke Forest, and said that the six members present were conducted through the area, and subsequently entertained at luncheon by the local Progress Association.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Miss A. F. Smith, 86 Station Street, Box Hill; Mr. Geo. Findlay, 101 Collins Street, Melbourne; Mr. A. H. Ferguson, Guarwyn Road, Murrumbeena; Mr. John Ingram, 30 Clowes Street, South Yarra; and Miss N. Moorehouse, 45 Arnold Street, South Yarra; and Mr. E. H. Hatfield, P.O. Box 22, Lilydale, and Messrs. G. P. Cleeland and F. T. Cleeland, "Nulgerong," Cannie P.O., as country members.

GENERAL.

The President stated, in regard to the Wild Flower Show, held at the St. Kilda Town Hall on October 5, that it was too early to make an announcement as to the financial result, but he wished to take the opportunity of thanking all those members and friends who had assisted in making the Show a success,

Mr. T. James moved and Mr. F. Chapman seconded, that a visit of members to "Maranoa" Garden, Balwyn, to label the native plants growing there, should be arranged at some future date.—Carried.

PAPERS.

Mr. H. B. Williamson gave a lecture, illustrated by lantern slides, descriptive of various interesting native plants which he had observed in different parts of Victoria.

EXHIBITS.

By Mrs. E. Coleman: Living specimens of *Prasophyllum Brainei*, Rogers and *Prasophyllum brevilabre*, Hook. collected by Mrs. D. J. Paton. Herbarium specimens of *Prasophyllum elatum*, R.Br., with stem 4ft. high and 42 expanded flowers and 28 buds; *Caladenia Patersonii*, var. *longicauda*, 3 ft. high, a two-flowered specimen with sepals over 6½ in. long, making a spread of over 13 inches (collected by Col. B. T. Goadby, Cottesloe, W.A.).

By Mr. E. E. Pescott, F.L.S.: Cultivated specimens of *Eucalyptus torquata*, *Hibiscus Huegelii*, *Clematis aristata*, var. *Dennisæ*, and *Leptospermum lanigerum*, var. *grandiflorum*—all in flower. Living specimen of *Moloch horridus*, the "Mountain Devil," from Transcontinental line.

By Mr. P. H. R. St. John: Herbarium specimen of *Bertya rotundifolia*, F. v. M. (Euphorbiaceæ), collected at Queenscliffe, February, 1886 (found in Herbarium, Melbourne Botanic Gardens). Not yet recorded as occurring in Victoria. Previously known only from Kangaroo Island.

By Mr. L. Hodgson: Cultivated specimens in flower of *Calytrix Sullivani* (Grampians Fringe-myrtle), *Hibiscus Huegelii*, *Pultenaea scabra* (Rough Bush-pea), *Eutaxia diffusa*, *Dodonaea viscosa* (Giant Hop-bush), *Grevillea asplenifolia*, *Grevillea aquifolium* (Prickly Grevillea), and *Chorizema cordatum*.

By Mr. F. Pitcher: Sponge collected on beach in Western Australia.

By Mr. A. C. Nilson: Several pieces of rock showing imprints of shells—found in railway cutting at Royal Park, 18/9/1926. The smell of the sea still clings to the rock.

By Mr. R. E. Luher, B.A. (for Mr. D. Orchard, Kinglake East): Specimen of Flying or Pouched Mouse.

By Mr. H. B. Williamson: Plants in illustration of his lecture.

ROYAL PARK EXCURSION.

More than a dozen members attended the excursion to Royal Park on September 18, notwithstanding the Club's two other counter attractions. On a glorious spring day the party went to the top of the rise to the east of Royal Park railway station. In the railway cutting there was seen the stratified Silurian bedrock of Melbourne, forming a major unconformity with the Kainozoic grits, gravels, sand and iron stones above it. Turning to the north-west were seen the granitic Macedon Ranges with their hyperbyssal core of Solsbergite that formed the Camel's Hump, while more to the south were clearly seen the granitic masses that now form the Anakies and the Youyangs. It was explained that being plutonic rocks these were formed in post-Silurian times in the bowels of the earth, and it was emphasised that the subsequent sculpture of the landscape had removed millions of tons of earth to have left them in their present upstanding position. The general flatness of the intervening country was explained as being due to the Tertiary outpouring of older and newer basalt that completely filled and blotted out the minor hills and valleys that had been carved. On the way to the railway cutting on the North Melbourne side of the station, river action on a small scale was closely examined. From the top of the hill the various stages of a river's life were studied. To the north were seen the steep V sides of tributary streams that were very young in age compared with the wider valley of the Moonee Ponds Creek, with its river terraces, while to the south was noted the River Yarra meandering through the wide plain near its mouth, so indicative of old age. The correlated rocks pointed out on both sides of the Moonee Ponds Creek valley brought home to members forcibly the river erosion of recent times, and make possible to conjure up the more stupendous river sculpture that through the age has carved out Victorian landscape.

After various questions had been answered, the party went into the cutting, examined closely the decomposition of the older basalt from the solid rock, and, last but by no means least, enthusiastically attacked with hammer and chisels the face of the cutting and obtained a very fair number of representative marine corals, shells and other marine fossils for which the cutting long since has earned fame among metropolitan fossil hunters.—R.E.L.

EXCURSION TO MORNINGTON.

Favored with a glorious day the outing arranged for September 23 (Show Day holiday) was a great success. Five members of the Victorian Field Naturalists' Club arrived by the morning train and were met at the station by representatives of the Mornington Naturalists' Club. Two others who came from town by car here joined the party. A move was at once made to a spot near "Marina," on the frontage, and here lunch was disposed of. While this was in progress the leader outlined the programme for the afternoon and gave a descriptive talk on the geological features of the locality, illustrated by a small collection of specimens, and also some information regarding the orchids, mentioning specially the newly-named species, *Caladenia praecox*, a specimen of which was on exhibition.

The party, which included eleven members of the local Club, was divided into groups according to interests, those whose fancy turned to orchids scouring the bush tracks under the guidance of Mary Evans and Ivey Chitts, while those whose inclination leaned to geology took a direct line to the fossil beds where some good work was put in.

As the visiting members were experienced geologists they needed no guidance, rather they gave much valuable information to our local fossil hunters, who were reinforced later in the afternoon by the orchid hunters. Among the most interesting trophies of the afternoon were two sections of chitons, both of which were found by Mr. Cudmore, a shark's tooth (*Odontaspis* sp.) discovered by Mary Evans, and a very fine silica sponge (*Ecionema newberyi*) the finder being Marjorie Allison.

Among the orchids the following were secured:—*Pterostylis nana*, *P. nutans*, *P. concinna*, *P. pedunculata*, *P. vittata*, *Caladenia latifolia*, *C. carnea*, *C. dilatata*, *Cyrtostylis reniformis*, *Acianthus exsertus*.

The Club's hand-waggon, well equipped with picks, etc., saved a lot of carrying. Special mention must be made of Mr. Cudmore's kind services with his car, which assisted most materially in the rapid transport of a number of the party, thus enabling us to take full advantage of the limited time between trains.

Afternoon tea was served at Fossil Beach, after which the Melbourne party took its departure.—GEORGE COX.

EXCURSION TO BALWYN.

On Saturday afternoon, October 2, about 30 members and friends took part in the excursion to Balwyn, under the joint leadership of Mr. F. Chapman, A.L.S., and myself. Mr. Chapman drew attention to some of the physiographical features of the district, and pointed out the different characteristics of the soil, making special mention of the higher sand-crowned elevations such as Beckett Park Hill and the Reservoir Hill, the intervening country showing the silurian bed-rock exposed by the erosion of the Koonung and W. Creeks between Doncaster and Canterbury, respectively.

The party then proceeded to Maling's Quarry, in which an outcrop of rock showed evidence of the folding of the earth's crust at a remote age. This rock, Mr. Chapman explained, consisted of brecciated silurian, and had undergone many changes in its composition some millions of years ago. Cr. J. D. Howie, of Camberwell, here joined the party and stated that the land in which the quarry was situated had recently been presented to the Council, and it was proposed to convert it into a small park in which native trees and shrubs would be planted, while the quarry itself would be formed into a pond.

After afternoon tea had been kindly dispensed by Mr. and Mrs. Chapman, at their residence at Balwyn, a visit was paid to "Maranoa" Garden adjoining Beckett Park. This garden comprises several acres on the highest hill in the district, from which extensive views are obtained. The garden was planted some years ago by the late Mr. J. M. Watson, and has recently been taken over by the Camberwell Council. Among the many native plants in bloom were several species of Grevilleas, *Calytrix Sullivani* (Grampians Fringe-myrtle), *Eriostemon myoporoides* (Long-leaf Wax-flower), *Prostanthera rotundifolia* (Round-leaf Mint-bush), *Hibiscus Huegelii* (of W.A.), *Thryptomene calycina* (Bushy Heath-myrtle), and others.

A large number of Acacias and Eucalypts of different species also showed vigorous growth, and in addition there was a good collection of exotic trees and shrubs, several of which were in flower.

It was suggested by Cr. Howie that the Club might later organise another visit to the garden, when the opportunity could be taken of labelling the various plants for the benefit of those interested.—L. L. HODGSON.

The Wild Flower Show.

Our Annual Wild Flower Show, held for the second time at the St. Kilda Town Hall on October 5, was generally considered one of the best the Club has yet organised. The general effect was very pleasing, the arrangement of the flowers being excellent, the grouping good, and the freshness of the blooms remarkable. Perhaps the cool weather was the main cause of their generally good appearance.

The Botanic Gardens, by the courtesy of the Director, Mr. F. Rae, and thanks more particularly to Mr. St. John, staged one of the finest collections it has ever sent.

Of the 52 species exhibited, the following were the most notable: — *Anigozanthos Manglesii* (W.Aust.), *Bauera rubioides*, *Bossiaea linophylla*, *Boronia heterophylla*, *B. elatior*, *B. megastigma* (2 forms), *B. Muelleri* (Victoria), *Chamælaucium uncinatum*, *Chorizema cordatum*, *C. ilicifolium*, *Calytrix Sullivanii*, *Callistachys elliptica angustifolia*, *Dendrobium speciosum*, *Doryanthes Palmeri*, *Dracophyllum secundum*, *Dodonæa viscosa*, *v. spathulata* (in fruit), *Epacris longiflora*, *Eutaxia myrtifolia*, *Eucalyptus torquata*, *Grevillea Caleyi*, *G. Hookeriana*, *Melaleuca squamea*, *M. ericifolia*, *Kunzea parviflora*, *Prostanthera Sieberi*, *Telopea speciosissima*, *Thomasia brachystachys* (W.Aust.).

Many of the visitors were noticed recording the names of plants which especially took their fancy, and enquiring where they could be obtained for cultivation in their own gardens.

The labelling of the plants at Mr. Williamson's tables, where 248 species, not including orchids, were systematically arranged, was, seemingly, much appreciated. Miss J. Galbraith, of Tyers, staged a splendid lot of Traralgon district plants, representing nearly 150 species, including 20 species of ferns and these also were labelled throughout.

Mr. Wisewould, as has been his custom for many years, showed a good collection from Pakenham, and Mr. Audas a representative set of Frankston plants. Mr. George

Coghill set out a fine lot of the flowers characteristic of the north, at Taradale, and Dr. Sutton some from the Brisbane Ranges. Gippsland was on this occasion much better represented than in former years. From the Cann River, Mr. W. Herbert sent *Boronia Muelleri* (pinnata), a fine specimen of the epiphytal orchid, *Sarcochilus falcatus*, and the Gippsland Waratah, *Telopea oreades*. Other interesting plants were sent by Mr. T. S. Hart, of Bairnsdale, who was assisted in this collection by Mr. C. Ketels, H.T., of the Sarsfield School; Mr. Easton, who was responsible for the very fine specimens of the silvery *Helichrysum elatum*; Mr. Henderson, of Hospital Creek; the H.T. of the Bairnsdale School, Mr. T. Lees; Mr. J. E. Rickards, and Mr. R. L. Smith. Amongst the material from Sperm Whale Head were the only specimens shown of *Thryptomene Miqueliana*, sent by Mr. F. Barton, Jr.

The Grampians' flora, usually such a conspicuous feature in our Shows, was absent on this occasion. The Mallee plants, sent by Mr. F. Holt and Mrs. Freyer, of Ouyen, and Mr. and Mrs. Loughheed, of Diapur, arranged by Miss F. Smith, included the beautiful blue Halganias, some Quandongs, white everlastings, the Flame Heath, and the Urn Heath. Mr. W. D. McPhee, of St. Arnaud, also made a very nice showing of plants from his district.

The orchid table was excellent, but Mrs. Coleman, with Miss D. Coleman, and Miss Davidson, were so hard worked that it is quite evident these lovely flowers will need to be dealt with in two sections in future, keeping one for the display of a named collection and the other for sales only.

56 species, in 14 genera, were tabled, including 12 *Pterostylis*, 12 *Caladenias*, 10 *Thelymitras*, 5 *Diuris*, and 5 *Prasophyllums*, 3 *Microtis*, 2 *Lyperanthus*, and one each of *Chiloglottis*, *Caleana*, *Calochilus*, *Acianthus*, *Cyrtostylis*, *Glossodia* and *Sarcochilus*. Those who contributed to the collection were Mrs. Eaves, Miss E. Hart, Miss Davidson, Mrs. D. J. Paton, Miss Galbraith, Mrs. F. Rich, Mrs. Brooks, Mr. A. B. Braine, and Mr. H. P. Dickens.

The Western Australian table, which, as before, was in charge of Miss Fuller, assisted by Mrs. O. Pugh and Mrs. J. Murray, held the finest collection—about 100 species—we have ever had from "Swanland"; this being due, of course, to the recent visit of our members to the Perth meeting of the Australasian Association for the Advancement of Science. Many of the western plants

were never before seen by Melbourne people, and their curiousness and beauty were a revelation. Perhaps the most notable were the Verticordias, the Kangaroo Paws (*Anigozanthus*) in red and green, yellow, orange and black, *Conospermums*, and the Banksias, *B. prionotes*, mandarin coloured; *B. grandis*, with its long yellow spikes, and *B. Baxteri*, with rose pink flowers.

The Queensland and South Australian tables were presided over by Mrs. V. Miller, Mrs. L. L. Hodgson, Mrs. E. Hanks, Mrs. D. Blair, Miss Keartland, Miss R. Morrison, Miss N. Moorehouse and Miss Wigan, and contained many fine things. From the northern State came *Helichrysum cassinioides*, a beautiful shrubby species with pale pink blossoms.

The display from New South Wales, which contained Waratahs, Flannel flowers, Eriostemons, amongst other good things, was in charge of Mrs. Pitcher and Mrs. Daley, ably assisted by Mrs. C. Levens and Mrs. Robinson, Miss Hughes, Miss Woinarski, Miss Josephs, and Miss Greives.

The flowers of our own State were in the care of Mrs. Edmondson, aided by Mrs. A. D. Hardy, Mrs. G. Coghill, Miss D. Nokes, Mrs. E. E. Pescott, Mrs. F. B. Sutherland, Miss Smith, Miss E. Hart and Mrs. D. J. Paton.

At the sales tables the material was both abundant and fine in colour, and all these ladies had a busy time, there being an eager demand for their stock, which included a large quantity of fern plants, brought by Mr. E. Cudmore from Pakenham.

Cultivated native plants were staged by Mr. G. Coghill, Mrs. Hill, Mr. E. E. Pescott and the students of the Burnley Horticultural Gardens, who also made a nice show of some collected in the field.

Contributions were also received from the following:—

MELBOURNE AND SOUTHERN.

Lara—Rev. A. C. F. Gates; Eltham—Mr. W. C. Tonge and pupils of H.E. School; Broadford—Mr. Hogan; Frankston—Mrs. Hall, Mrs. Daley and F. Daley; Pantton Hill—Reg. Gardiner, Rudolph Fourbister; Beaconsfield—Mr. H. P. Dickens; Montrose—Miss G. Richards; Lorne—Harold "Photo"; Red Hill—Mr. G. Higgins; Mornington—Naturalists' Club, Rev. G. Cox, leader; Montmerency—Miss G. Nokes; pupils of State School; Heatherton—Mr. J. O. Reid; Brighton—Miss M. Cooper;

Belgrave—Mr. F. Pitcher; Hurstbridge—Mr. J. H. Gardiner; Airey's Inlet—Mr. W. de C. Berthou.

WESTERN DISTRICT.

Casterton—Miss N. E. Dancocks; Port Fairy—Mr. W. U. Riddell; Stawell—Mr. J. A. Hill; Dartmoor—Miss J. Jarrad.

GIPPSLAND.

Hedley—E. and L. Rossiter; Drouin—S.S. Drouin South, H.T. Mr. R. Currie; Garfield—Miss L. Dyll; Outtrim—Mr. W. Herbertson; Sperm Whale Head—Mr. F. Barton, jr.; Moe—Mr. J. A. Dower; Traralgon—Miss J. Galbraith, Mrs. Gooding, Tyers.

NORTHERN DISTRICTS.

Beechworth—Mr. A. Ladson, Mrs. Goodyear; Rushworth—Mrs. F. Rich; Strathmerton—Mr. A. Kenny; Molesworth—Miss Jeffreys; Nagambie—Mr. D. Parris; Lima East—Mrs. L. A. Stafford; Cobram—Miss O. Weatherell; Taradale—Mrs. Dorman; Maldon—Mrs. T. B. Brooks; Yapeen—Geo. Lawson and Willie Lyle; Guildford—Mrs. Tyzack; Bendigo—Messrs. Daley and Miller; Dingee—Mrs. J. Grylls; Boort—Miss McKenzie.

NEW SOUTH WALES.

Mr. J. Morrison, Denison Road, Lewisham; Mr. C. Butler, for Naturalists' Society, Sydney; Miss J. Froggatt, Croydon, N.S.W.; Mr. Chalker, Hill top, N.S.W. (purchase).

QUEENSLAND.

Mr. H. N. Slaughter, Thulimbah, near Stanthorpe, Q.

SOUTH AUSTRALIA.

Colin Jenkins, Keith, S.A.; S.A. Field Naturalists' Society.

WEST AUSTRALIA.

Mr. E. L. Haynes, Kelmscott; Mr. T. H. Blake, Mt. Lawley; Mr. R. Perry, Pemberton; F.N. Club, Perth; Congregational Manse, Busselton; Mr. Walter Exley, Victoria Park, Perth; Mr. O. H. Sargent, Perth; Miss Nancy Morgan, Claremont, Perth; Mr. Geo. Buchanan, c/o. Elder Smith, Mullewa; Mrs. C. Paterson, Mt. Magnet; Mr. J. S. Ding, per Mr. J. W. Audas, Merredin; Miss Winnie Dedman, Mrs. S. Furphy and Mr. E. E. Pescott.

The microscope section was in the hands of Mr. C. A. Lambert and many interesting slides were shown and explained by him and Messrs. S. Butler, F. Chapman, J. Eaton, R. V. Gray, T. J. James, E. A. Saxton, A. L. Scott, J. Stickland, J. M. Wilson, J. Wilcox, and Dr. R. M. Wishart.

The Bookstall and Information Bureau were in the care of Mr. C. Daley, and Miss N. Thresher had the custody of Miss Fuller's flower pictures, which attracted a great deal of attention.

All those above-mentioned helped greatly towards the success of the Show, but the real heat and burden of the day were borne by a few others, more particularly by Mr. F. Pitcher, who again directed affairs, and who had previously done much work in the way of advertising and organising the event, by Miss Gabriel, who, assisted by Mrs. F. Chapman and Miss Cruikshank, undertook the irksome duty of providing refreshments, by Mr. V. Miller, who was a host in himself, and was responsible for the erection of trestles, their dismantling, and much other valuable work both before and during the Show; by Mr. Hughes, who received and opened all the packages; and by our Honorary Secretary and Honorary Treasurer, Messrs. L. L. Hodgson and A. G. Hooke, whose services were too obvious to need special mention.

Mr. Keep most kindly placed a motor lorry and driver at the disposal of the Club for the carriage of parcels.

NOTES ON TWO MALLEE WASPS.

In the Mallee, during the summer, when flies are a torment to man and his domestic animals, few insects are more welcome than the friendly policeman fly (*Sericophorus relucens*). Half a dozen of these small wasps will soon "arrest" and carry off the annoying flies. It was several years before I discovered a burrow of *S. relucens*, and at first, from the appearance of the earth around the hole, I thought it possible that the wasp made use of a beetle's burrow. On closer acquaintance I found that the excavating was the unaided work of *Sericophorus*. A damp situation is chosen for the site, and until the burrow has reached a certain depth, the wasp flies into the air and flicks each pellet of earth into space. Later, the earth is pushed up from below, and falls around the burrow in a manner similar to that of certain burrowing beetles.

Last season I was interested in the habits of a small wasp—*Pompilius nubilipennis*. Like many species of wasps, her habit is to leave her game on the threshold of the burrow and then make a final inspection below. I had removed her spider half-a-dozen times, without causing a variation in this peculiar action, and on the last occasion some ants had located the prize. The wasp attacked the ants savagely, and then quickly hauled the spider away. At some distance from the place, and in the open, she stung the paralised creature viciously in several places, then chewed off a front leg, mutilated a back leg, and after sucking at the juices for a brief period, deliberately abandoned the victim. For some time I watched her on the hunt, with wings flick, flicking, as she worked over the ground, but she made no attempt to return to the object of her wrath.—L.G.C.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART III.

3. MICROTIS, R.Br.

(Small eared.)

Flowers, in Victorian species, green; small, numerous, in a terminal spike. Dorsal sepal broad, erect, hooded over the column, thus being concave. Labellum sessile, obtuse, truncate or emarginate, oblong, ovate, or orbicular. Column short and wide.

Terrestrial glabrous herbs, bearing small tubers. Leaf solitary, terete, opened out near the stem, and continued in a close sheaf down the stem.

The genus extends to New Zealand, and also to New Caledonia, Java, Formosa, Philippines, Japan and Southern China. There are nine Australian species, seven of which are endemic. The genus reaches its highest expression in West Australia, where eight species are recorded. Four species are recorded for Victoria. The genus is readily recognised by its small green flowers, closely compacted on the stems.

1. *M. PORRIFOLIA*, Spreng. (Leek-leaved). "Common Leek Orchid."

Labellum *emarginate* at tip: two well defined callosities at the base and one near the tip. Dorsal sepal erect, hooded, broadly ovate. Lateral sepals shorter, spreading, recurved, oblong, somewhat blunt. Petals oblong, erect. Labellum sessile, *oblong, with crisped or irregular margins*; tip blunt; lamina with two raised lines and a central one.

A common species, of variable habit from 2 to 12 inches, generally robust. Leaf usually longer than the spike of small green flowers. Flowers usually dense, but occasionally distant.

This is one of the few orchids that survive cultivation for a few years, being occasionally found among crops and in cultivated plots.

Recorded from all districts, and all States. This species also extends to New Zealand.

2. *M. PARVIFLORA*, R.Br. (small-flowered). "Slender Leek Orchid."

Labellum *entire*. Two well-defined callosities at base, *none at tip*; oblong, ovate-oblong or ovate, partly hidden

by the dorsal sepal. Tip of labellum rounded or sometimes rectangular; *margins entire and quite smooth.*

Usually a more slender species than the former, and often mistaken for it. The leaf again exceeds the green flower spike; and the plant is variable, being from 3 to 24 inches in height. The form and shape of the labellum, the difference in margins, as well as the absence of the callosity at the tip, form the principal differentiations between the two species.

Mr. Oakes Ames, the well known American orchid authority, some years ago united the two former species under the species, *M. uniflora*, Reichb. f. That was nearly thirty years ago. As the British Museum authorities do not to-day accept that view, and as the differences between the two plants are quite distinct, it is well to retain the two species.

3. *M. OBLONGA*, Rogers. (Oblong-labellum.) "Oblong lipped Leek Orchid."

Labellum reflexed, *narrow oblong*, margins crenulate, with two large callosities at the base and one near the apex. Column stout and short. Dorsal sepal erect, narrowly hooded. Lateral sepals revolute. Lateral petals erect, obtuse or truncate, linear falcate.

A quite slender plant, varying from a few inches to 3 feet in height. Flowers quite small, distant, on short pedicels. Leaf long and usually exceeding the flower spike.

The species has long been confused with *M. porrifolia*. It is more of a hill or mountain plant, much more slender in habit, and flowering later, from November to January. In some seasons, the plants seem to rest, for occasionally quite few plants are seen, where usually there are many.

It is readily recognised from its oblong labellum with a crenated margin, and by the presence of the callus near the apex of the labellum.

Recorded from the N.E., S.W., and S. Common at Sherbrooke Gully; found also in South Australia. Recently I found a number of plants growing several feet high on tree ferns, which were definitely orchid plants, and which, although not in flower, could almost with certainty be determined as *Microtis*. From the locality—Sherbrooke Gully—it would almost be certain that these would be plants of *M. oblonga*.

4. *M. ATRATA*, Lindley. (blackened—the plants when dried.) "Swamp Leek Orchid." Labellum oblong or

PLATE IX.



THELYMITRA LONGIFOLIA
(R. & G. Forst.)
Common Sun Orchid.



THELYMITRA ARISTATA
(Lindl.)
Scented Sun Orchid.



almost square; tip quite blunt, margins entire. Lateral sepals oblong, blunt, not recurved. Petals shorter, and spreading.

A very small, almost tiny species, from 1 to 3 inches high, often only 1 inch. Leaf far exceeding in length the flower spike. Flowers and leaf of a uniform pale green colour, flowers very minute.

Usually found in wet or swampy places, often growing almost submerged. I have seen it in the Wartook (Grampians), Reservoir, growing at the edge in many thousands. The whole plant blackens when dried. Flowers in September and October. Recorded for S.W., and S.; and also from Tasmania, South Australia, and West Australia.

4. PRASOPHYLLUM, R.Br.

"Leek leaf."

Flowers reversed, Dorsal sepal lanceolate or broad, concave, sometimes arched, often recurved. Lateral sepals sometimes free, sometimes united (connate). Petals usually shorter than the sepals, lanceolate or linear. Labellum sessile or attached by short claw to base of column; undivided, the margins crisped, denticulate, ciliate (hairy) or entire: the surface having a longitudinal central callus. Column very short, not winged, with two lateral erect appendages.

Terrestrial glabrous herbs with globular, or ovoid tubers. Leaf solitary, usually terete, often sheathing the base of the stem, and very much reduced in the smaller species, often quite dry at time of flowering. Flowers several or many on a terminal spike, green or greenish, white, lavender, yellow or purple and occasionally fragrant.

About 60 species are known, 58 of which are recorded for Australia, 23 species are recorded each for Victoria and New South Wales, while only 7 are known in Queensland. The genus is therefore more temperate than tropic. Four species are found in New Zealand.

The genus is admitted on all sides to be one of the most difficult of determination. The flowers are so small, the species often so much resemble each other, and there appear to be so many intermediate forms, that recognition is very difficult. Even where standard features are laid down, these are not at all constant. Thus the cohesion or union of the lateral sepals is usually considered to be a specific consideration, but even this is not

permanent. In over one hundred flowers of *P. brevilabre* collected from many spikes found at Healesville, it was noted that nearly half were not united in the sepals.

The genus is distinguished from all others by having the *flowers reversed*, or placed upside down on the spike: thus the labellum points upwards instead of downwards.

The species vary considerably in height: *P. elatum*, our tallest species is often 3 or 4 feet high, while *P. despectans*, one of the smallest species, is found only 2 inches high.

Prasophylla are to be collected for many months in the year. The smaller species flower in autumn, and the taller and more robust in spring and summer. A few flowers are also to be collected in winter.

1. *P. AUSTRALE*, R.Br. (Southern.) "Austral Leek Orchid."

Leaf fully developed at flowering time; plant from 1 to 3 feet in height, lateral sepals usually connate; flowers sessile, ovary slender, green and white in colour; sepals and petals all acute; the dorsal being erect, sometimes recurved; labellum white, sessile, reflexed about the middle, often acutely; the end crisped, with undulate margins; the callous portion ending in two rounded knobs or plates.

This is an early summer flowering species, conspicuous for its white labellum, and its slender ovary or seed vessel. The flowers are not very distant on the spike; the leaf is usually quite long, and the flowers are often sweetly scented. It is found in all of the States, and has been recorded from all parts of Victoria except the N.E.

2. *P. FRENCHII*, F.S.M. (after George French). "Stout Leek Orchid."

Leaf not always as tall as the flower; flower dark purplish, or purplish green; flowers slender; sepals and petals usually narrow-lanceolate, but sometimes lanceolar ovate; labellum somewhat cuneate-orbicular; incurved; the terminal end almost deltoid, membranous and only slightly crisped.

This is not always "stout" as the vernacular name implies, frequently it is quite a dainty and slender species, with slender flowers. The purplish color of the whole flower distinguishes it from all other species.

It is interesting to note that this orchid was found by two collectors on the same day. Mr. George French found it near the Dandenong Ranges, and Mr. F. G. A. Barnard at Tooradin. Mr. French was an officer of the

National Herbarium, under Baron von Mueller, and so took his new find to the Baron on the Monday morning. The Baron at once named it in his honour. A few hours later Mr. Barnard brought along his "new orchid," only to find that he had been just forestalled by Mr. French.

Recorded only from Victoria, and there only from the S. and N.E.

3. *P. TADGELLIANUM*, Rogers (after A. J. Tadgell). "Bogong Leek Orchid." Plant short and stout, leaf exceeding the stem; flowers 8 to 12, greenish and yellow with chocolate markings; dorsal sepal widely lanceolate; lateral sepals connate to the middle. Labellum sessile, lower half almost orbicular erect against the column, then recurved, narrow and cuneate beyond the bend; callous part widely triangular at the base, prominently raised; membranous part narrow throughout.

This plant was formerly classed as a variety of *P. Frenchii*. The labellum is not laterally contracted as in that species. It is purely an alpine plant found only at Mt. Kosciusco, and on the Victorian Alps. Never collected below 5,750 feet.

See "Victorian Naturalist," April, 1924, for illustration.

4. *P. FLAVUM*, R.Br. (yellow). "Yellow Leek Orchid." Stem stout, sometimes two feet in height; leaf very short, one inch or more only in length, otherwise the plant is leafless; flower, *greenish yellow*, often yellow, stem brown; ovary elongated; sepals acute, lanceolate; lateral sepals connate; labellum sessile, gradually recurved, inner plate not very prominent; lateral appendages to column short, broad, and is lobed at the end. Flowers numerous; roots fleshy, thick and tuberous.

This yellow, strong stemmed species is quite rare in this State. It has been found at Belgrave, Grampians, Baw Baws, and Cravensville. In each case only a few specimens have been found. The thick, fleshy, tuberous roots somewhat resemble those of *Dipodium punctatum*.

It must not be confused with the yellow or yellowish form of the following species. The almost absence of the leaf and the gradual recurving of the labellum, distinguishes this species from *P. elatum*.

Flowers in December, January. Recorded also from New South Wales and Tasmania.

5. *P. ELATUM*, R.Br. (tall). "Tall Leek Orchid." A robust species, quite the tallest in this State, growing from two to four feet in height. Leaf long, often exceeding the spike. Spike many flowered, flowers fairly

large, varying from pale green, yellowish green, purple to purplish black. Lateral sepals connate almost throughout. Dorsal sepal lanceolate, petals, somewhat narrower. Labellum sessile, ovate, recurved from near the middle; margin in front somewhat membranous and corrugated, or crisped.

This tall species is sometimes common in moor or heath lands along the coast, and as well inland. The colour variations grow freely intermingled, and the yellow form has more than once been recorded as the preceding species. It is reputed to flower quite freely after a fire has passed over its habitat.

Recorded from all districts but the N.E., and also from all other States except Queensland. Flowers in October and November.

6. *P. GRACILE*, Rogers (slender). "Slender Leek Orchid." Usually a slender species, upwards of nine inches high. Leaf short; flowers yellowish green, rarely purple, arranged in a free loose spike; petals linear lanceolate, with incurved tips. Labellum on a well marked claw, erect part deeply concave with entire margins; the part in front of the bend narrow, triangular, sharp pointed, margins slightly undulate; membranous part white and glandular.

This is one of our very rare species, and has only been recorded from the Grampians and from Ringwood, collected possibly once from each locality. It is a South Australian species and flowers in October and November.

7. *P. ODORATUM*, Rogers (fragrant). "Sweet Leek Orchid." Usually a tall plant of a foot or 18 inches high, not always robust in this State. Leaf generally exceeding the spike. Flowers not small, varying in colours and shades of pink, heliotrope, and also white, very sweetly fragrant. Dorsal sepal long, incurved at first and finally recurved; lateral sepals pointed and widely divergent. Labellum clear white, sessile, reflexed from the middle, tip well turned back; erect part bulging with entire margins; reflexed part with wavy crenulate margins, bluntly triangular callous plate not thick, but quite prominent, the membranous portion exceeding the callus.

Var. *album*, Rogers (white). "White Leek Orchid."

This is a smaller plant, with small white flowers, not often pale pink. In Victoria it is sweetly scented, but in South Australia it is recorded as not fragrant. The labellum is not reflexed so accurately, and the reflexed part is generally shorter than the erect part.

PLATE X.



PRASOPHYLLUM ELATUM, R.Br.

Tall Leek Orchid.

Both of these plants flower in October and November, and are only recorded from the S. and S.W. The variety *album* is fairly abundant at Ringwood.

8. *P. BREVILABRE*, Hk.f. (shortened). "Short lipped Leek Orchid." Usually a robust plant, up to 12 inches high; leaf as long or longer than the spike; ovary short and somewhat oblong. Flowers up to 12-18, well spaced on the stem, dark brown, purplish or dark red, and white; dorsal sepals usually united, but just as often free, variable in this respect; labellum closely reflexed at centre, erect part narrow, the margins undulate; the central part, prominent and broad, and terminating about the reflexed part. Lateral lobes entire and having a prominent gland near the base of the margin.

This species has been recorded from all parts of the State except the N.W. It is often abundant in hill and forest country, particularly so in some places around Healesville. Recorded also from Queensland, New South Wales and Tasmania.

9. *P. PATENS*, R.Br. (spreading). "Pale Leek Orchid." A slender plant up to 18 inches to 2 feet in height, the length of the leaf very variable. Flowers well spaced on the spike, the perianth segments being well spread apart, flowers yellowish green or brown, dorsal sepal often recurved, lateral sepals free and often bidentate (two-toothed). Petals linear, usually blunt, white, sometimes pale pink, incurved. Labellum sessile, ovate-lanceolate, as long as the petals; reflexed erect portion not broad; margins white, undulate well defined, inner plate not very prominent. Lateral appendages narrow oblong, with blunt tips and rounded basal lobe.

This species is recorded from every section of the State. Its conspicuous labellum, together with the spreading perianth segments mark it out clearly. It flowers from September to November, and is also recorded from Queensland, New South Wales, South Australia, and Tasmania.

The variety *pruinsum*, Rogers, from South Australia, is prune coloured, having a long basal lobe to its lateral appendages.

10. *P. COLEMANAE*, Rogers (after Mrs. Coleman and her daughters). "Lilac Leek Orchid." A moderately stout plant, often 18 inches high, carrying a rather loose spike of about 21 *lavender* or *lilac* flowers. Dorsal sepal greenish, the conical point recurved or erect. Lateral sepals green, *fluted*, *spreading*, very divergent. *Petals*

lavender, with a narrow green central stripe, spreading. Labellum *lavender*, margins crenated, widely ovate, nearly sessile. Column short; lateral appendages oblong falcate and lavender tinted. Anther purplish.

The "Lilac Leek Orchid" has so far, only been collected at Bayswater, where it was found by its namesake in 1922. See "Victorian Naturalist," August, 1926, for illustration.

11. *P. FUSCUM*, R.Br. (dusky). "Tawny Leaf Orchid." A plant of medium size, up to one foot or more in height. Flowers many on spike, somewhat small, standing out well from stem, often tawny or dusky brown in colour, but also bright green. Sweetly fragrant. Dorsal sepal long, ovate-lanceolate, generally erect; lateral sepals free, usually with cylindrical bidentate points. Petals erect and bluntly linear. Labellum, erect part concave or bulging with entire margins, recurved part acute with crisped margins; inner or callous plate not very distinct at base, occupying a large part, increasing in thickness, and reaching nearly to the tip. Lateral appendages wide and blunt, almost oblong.

This is a decorative and dainty species, often found growing under hard open conditions. The fragrance is constant, both in the dusky and green forms, which are quite distinct in colour. Flowers in spring; recorded from all parts; and also from Queensland, New South Wales, South Australia and Tasmania.

12. *P. BRAINEI*, Rogers (after A. B. Braine). "Green Leek Orchid." A slender plant, about a foot high; flowers green, with a narrow leaf about as long as the spike. Flowers almost sessile; ovary long and obovate. Floral segments all glandular. Dorsal sepal erect or recurved, ovate lanceolate, slightly contracted at base. Lateral sepals free, somewhat divergent. Lateral petals erect, narrow linear oblong. Labellum sessile, margins entire until beyond the middle, then recurved and reflexed, margins crenulate and *very shortly ciliate* from the bend to the tip. Callous portion dark green, *margins shortly ciliate*; membranous part wide and somewhat white. Lateral appendages rather large, broadly oblong with blunt oblique tips.

This species is casually distinguished from the green form of *P. fuscum*, by the dark green of the labellum, and the ciliate hairs referred to above. It has only been found growing among *Juncus* at Ringwood, where it was collected by the author and C. French, Jr. It flowers in October.



ORCHIDS AT THE NATIONAL PARK

A party of four (Dr. and Mrs. R. S. Rogers, of Adelaide, my daughter and myself), spent an interesting week at the National Park, Wilson's Promontory, early in September.

Our chief object was of course to search for interesting orchids, though we were prepared to accept gratefully whatever natural history interests the Promontory might provide for us; and we were not disappointed.

From the nature and situation of the National Park these interests are necessarily many and varied, for the country consists of hills and gullies, gentle rises or hollows covered with heath and other wild flowers, one of the most abundant being our beautiful red *Correa*. There are rocky coasts, delightful sandy bays, or quaint islands where many sea birds find resting places; and there are sedge-covered swamps or tea-tree fringed river flats, yielding a rich harvest for all—botanist, zoologist, geologist, or the student of marine life; and he would be hard to please who could leave the Park without a host of delightful memories and a few treasures for his museum or his herbarium.

The journeys to and from the Park are not the least delightful of our recollections, while our week was crowded with interests. The briefness of the holiday allowed us only partly to measure the wealth of natural treasures the Park provides.

We were a little too early for most of the spring orchids, though, had we gone later we might have missed two species that were of especial interest.

Of pterostyles we collected 11 species, including two probable hybrids and one that we thought new. It appeared at first to be a hybrid—*P. alpina* x *P. pedunculata*, but has since been found at Healesville. Its claims to specific distinction are now under consideration.

Cyrtostylis reniformis was abundant—very many one-flowered specimens being noted. There were fine flowers of *Acianthus caudatus*, among them two entirely green specimens.

Among thousands of corysanthes leaves we found only two or three flowers of *C. pruinosa* and seeded flowers of *C. unguiculata*.

It was early for the species of diuris, which were just commencing their season, also for thelymitras, which, with the exception of *T. antennifera*, were mostly immature.

Of the caladenias, only *C. latifolia* was abundant—two and three flowered specimens being numerous. Of the others, except in bud, we found none in large numbers.

Altogether we collected 33 species.—MRS. COLEMAN.

FLYING OR POUCHED MOUSE

Flying or Pouched Mice are found in central Victoria along mountain creeks. They are very rare, and live in small colonies in the hollows of trees during the day-time. They come out to feed at night and by no means are easily caught. Tree fellers for saw mills are the people who mostly find them in bringing down some giant tree having a dry hollow somewhere in its side. Domestic cats also bring them to the country home occasionally, just as they bring in the ordinary mice in the cities. I have received several specimens in that way. When the cats have kittens to feed they usually bring these flying mice home alive for the kittens to play with before killing and eating them. These interesting little animals are the smallest of the Australian marsupials and look quite as handsome as the larger species, especially when one has a young one looking out of the pouch. Then they look the prettiest of our native animals. In reality they are a pigmy flying squirrel or phalanger, to which order they belong.

The specimen shown was caught by the household's cat and brought home alive, but it soon afterwards died. It is thus apparent that our domestic cats in the bush destroy quite a lot of our native animals as well as our native birds, and these latter in no small numbers through the year, especially the harmonious Thrush which the cold of winter compels to come around our doors in the bush eagerly looking for a few crumbs.—DAVID ORCHARD, Kinglake East.

FRIENDLY WATTLE BIRDS.

I have generally believed the Wattle bird to be rather shy until this season. All this year a pair of these birds have remained in our garden, and lately have been energetically climbing up the standard and other roses, eating off the blight. They have built their nest and are now rearing a brood in a pittosporum tree opposite my dining room window, the branches of which touch the verandah, 6 ft. wide. Some one is nearly always in the room, and as the window is mostly open they can be easily seen a few feet away; moreover at night our blind is seldom down, the lamp light shines directly on the tree. On the verandah one can be on the lounge with the birds flying in and out feeding their young a few feet overhead. Perhaps this is not unusual, but I have not known it to occur before.

We also have this year again nesting with us, the Magpies, Magpie Larks and Butcher birds. The bush fires in January drove the Coach-whip birds from our gullies, but during the last three weeks they are back again, just below the house.—F. WISEWOULD, Pakenham Upper.

BITTERN IN CAPTIVITY.

Rarely, if ever, is the booming called of the Bittern, *Botaurus poiciloptilus*, heard near Melbourne, where its former haunts in reedy swamps and marshland are hardly remembered now. But a fine example of this curious bird is thriving in the Zoological Gardens. It has taken more kindly to captivity than any of its predecessors domiciled in the Gardens. In the wild state. Bitterns prey chiefly upon frogs, small fishes, and aquatic insects; the bird at the Zoo, Mr. Andrew Wilkie tells me, catches sparrows, and swallows them whole!

It is interesting to watch the Bittern at bay. Facing the intruder, it crouches, half opens its wings, puffs out its plumage—especially the neck-feathers, and slants its beak upwards, almost as a bayonet is pointed by a soldier, prepared to receive a charging foe.—C.B.

HON. LIBRARIAN'S NOTE.

The Hon. Librarian has in stock, and available to members, "The Southern Science Record," Vol. I., Nos. 1-13, of which three sets can be supplied at 9/- each, and odd parts in addition; Vol. II., Nos. 1-12, one volume at 12/-, and odd parts, 1-10, at 1/- each. Members are reminded that back volumes of the "Naturalist" can be obtained at from 3/- per volume (Vol. xi.-xviii. inclusive, and some others) upwards; and that they should not neglect the present opportunity of completing their sets at a reasonable figure.

The Hon. Librarian would be glad to obtain copies of the "Victorian Naturalist," for July, 1885, January, 1886, June, July and August, 1887, and April, 1917, so that complete sets can be made up in the future. A good price will be given for these.

LIFE HISTORIES OF *MILETUS* BUTTERFLIES.

BY C. H. BORCH.

Butterflies of the genus *Miletus* are noted for the brilliant coloration of the undersides of their wings; and *M. apollo*, the largest species found in Australia, is a regal insect; while *M. narcissus* is a little gem. When collecting with Mr. A. Burns, in the Cairns district, N. Queensland, last summer, I obtained larvae and pupae of both these species, and learned something of the life histories.

Larvae of *M. apollo* were found feeding in the bulb of an epiphyte—not an orchid, but a lily—while pupae also were sheltering in the plant. Each of the lily bulbs, growing on tree trunks, was honeycombed with tunnels made by small black ants, and when opened had the appearance of a sponge.

Searching for butterfly larvae was no pleasant pursuit. One of us would climb the tree, while the other remained below ready to catch plants as they dropped. The first vibration of the tree-trunk—often that of a sapling—brought the ants from their citadel in battalions. They swarmed over the butterfly hunter's wrists as the lily plant was siezed by him, and dropped on to his neck and his back. The climber, on descending, had to stamp and jump, and slap vigorously to free himself of angry ants. Then the bulbs were cut open, and searched for the rewards of "raiding."

The larvae of *M. apollo* are of a dirty white color, rather rounded, and nearly or quite naked. They are sluggish, and shelter in the ant-tunnels, eating the walls of a slowly enlarging cavity, in which they pupate. Some of the older bulbs we examined, were little more than shells—having been eaten out by generations of butterfly larvae. The pupae are reddish, and semi-transparent, the wing-cases being visible in glowing red when the insects are ready for emergence.

A larvae of *apollo* we obtained pupated on January 25th, and a male butterfly emerged on February 12th, the pupal period being 18 days. It is remarkable that in travelling through the tunnels in the lily bulb, these butterflies do not injure their delicate wings. Apparently, immediately on emergence from the pupa case, they crawl towards the light, development of the wings being checked until the insects are out in the open.

Larvae of *M. narcissus* also were obtained on a lily plant in the same locality, seven miles from the coast, as that favored by *M. apollo*. They were much flatter, rather darker, and more hairy than the caterpillars of our moonlight Blue, *M. delicia*, found at Springvale. It was not ascertained definitely, whether they were eating the leaves or the bulbs of the lily, probably the latter. Pupae were found amid the little mass of roots between the epiphyte and the tree-trunk.

Until we discovered *M. narcissus* breeding so far from the coast, I had deemed it a mangrove feeder, like *apelles*, of the mud-flats. A trip to the Cairns Inlet, at Woru, seemed to confirm this, as the insect was obtained there on the wing, or settling on the mangroves. However, we afterwards found the lilies growing quite close to the spot. We kept a bright look out for crocodiles, as it was a quiet lonely spot, said to be frequented by these reptiles. We had to search close to the water's edge, but we did not see a crocodile.

MORNINGTON NATURALISTS' CLUB.

Our Club has now entered on its third year of work, and though there has been a slight falling off in numbers, that is more than compensated for by the increase in interest in those who remain.

This season some of our girls have concentrated on orchids, and one member—Mary Evans—has located no less than 17 species within two miles of Morningson. All our specimens have been submitted to Mr. W. H. Nichols, who has kindly identified them for us, as well as ensuring a verification of records.

The species recorded for this season so far are:—*Pterostylis conicina*, *P. nutans*, *P. pedunculata*, *P. vittata*, *P. nana*, *Caladenia latifolia* (pronounced by Mr. Nichols a very fine specimen), *C. carnea*, *C. dilatata*, *C. deformis*, and the newly named species, *C. præcox*, *Diuris palustris*, *D. longifolia*, *D. pedunculata*, *Corybas* (*Corysanthes*) *pruinosa*, *Acianthus exsertus*, *A. caudatus* (found by Nancy Jenkins), *Cyrtostylis reniformis*, *Thelymitra antennifera*, *T. pauciflora*, *Glossodia major*.

Concerning *Caladenia præcox*, this was found by Myra Sonnenberg just too late for inclusion in Mr. Nichol's description in August issue of the "Naturalist." In acknowledging its receipt he thus describes it—"The finest specimen I have seen, usually 1 or 2 flowers, yours is tri-flowered. a very tall and noble specimen." Morningson is a new district for this species.

Our membership now stands at 33, including three corresponding members. This is a new departure whereby young people living at a distance may join, such corresponding regularly with our resident members in turn and carrying on a systematic exchange of specimens through the leader for the Club's collection. Our corresponding members are as far apart as Queensland, Tasmania and Gippsland.—GEORGE COX, Leader.

BLUE WRENS IN MELBOURNE GARDENS.

Writing on Blue Wrens in the "Naturalist" of August last, D. Dickison says—"few, if any of the males lose their bright plumage during winter." My experience is of nine pairs of birds about the Treasury and the Fitzroy Gardens, Melbourne, some of which have been observed for three years. Seven of the nine males went out of colour last winter. Two appeared to keep their blue plumage all the year. Three that I have watched for three winters were out of colour this year. All are very careful to keep to their own particular localities. If one crossed a path into another's flower bed, it was at once chased out by one or other of the pair occupying it. One pair, behind the Treasury, has its domain separated by quite an imaginary line from that of the neighbouring pair a few yards away. This exclusiveness is, however departed from about June, when the parent birds take the young ones out to get rid of them to would-be partners. Not all are disposed of thus, and those not mated feed the second and third broods willingly, and some even stay with their parents for three years, though in full colour:

The greatest fear the Blue Wrens have is of the White-naped Honeyeaters (*Ptilotis penicillata*) swooping down on them, and if feeding in the open they watch carefully for these assaults. On windy days, too, the noise seems to prevent them ever leaving the shelter of the bushes.

These Wrens are all known birds that come when called, to eat egg or cake, and call out complainingly if we pass without feeding them. They are as follow:—

1. The Treasury pair which has been reported to have nested near here each season for four years. The male does not change colour in the winter.
2. The pair in the old Scotch College garden. The male is from No. 3, where he fed the young ones for three years, although in colour.
3. The very tame pair at the arch in the Treasury Gardens in Lansdowne Street. These are so tame that they feed out of our hands. Last year a bough fell on the archway while they were nesting. In consequence they tried to nest in the rubbish below, but were driven out and returned to the arch. They come many yards to meet us when called.
4. The pair in the left hand bed in the Fitzroy Gardens. The female, who is white-eyed, is from No. 3. She wandered over to the left, where she mated with a lone male. They then frequented the gully for a time, but finally returned, and are now (September) nesting in the pine tree.
5. The pair on the right hand side of the path in the small cypress. Last year they built in a palm. The cock, specially, fed the young ones. This year they have already hatched out. A different pair built in the same place before, but were disturbed.
6. The pair in the rubbish tip beside the gully. The female is an albino. These have a very wide range.
7. The pair in the hedge round the gardener's house. This male has two white shoulders. The female comes from as far as 100 yards to meet us.
8. The pair nesting just outside the work-shop.
9. A white-eyed female and her mate living just behind No. 1.

—G. HORNE.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 8th NOVEMBER, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS

Miss P. H. Patterson,
Yarra Grove, Hawthorn.
Miss W. Watsford,
Yarra Grove, Hawthorn.
Mr. A. A. Carter,
Threadneedle St., Balwyn.
Mrs. H. Virgoe,
Alexandra Club,
Collins St., Melbourne.
Mr. E. J. D. Shew,
Malin St., Kew.
Mr. J. E. Dowdle,
20 Holyrood St.,
Hampton.

Miss Jessie Thomson,
Miss B. S. Thomson,
Strathern Girls' Presby-
terian Grammar School,
Power St., Hawthorn.

Miss Wigan,
15 Lambeth Rd., Toorak.
Dr. D. Rosenberg,
343 Church St.,
Richmond.

Mr. Robt., O'Brien,
State School,
North Brunswick.
Dr. J. Kenneth Clark,
156 Collins St., Melb.

AS COUNTRY MEMBERS:

Mr. Fred A. Wallace,
Glenalladale,
via Fernbank.
Mr. C. E. Clayden,
Sumner, N.Z.

AS ASSOCIATE MEMBERS:

Mr. John I. Tonge,
Mr. Roy Lyndon,
804 Malvern Rd.,
Armadales.

PROPOSER:

Mr. F. Chapman,
A.L.S.
Mr. F. Chapman,
A.L.S.
Mr. F. Chapman,
A.L.S.
Mr. A. E. Keep

SECONDER:

Mr. L. L. Hodgson
Mr. L. L. Hodgson
Mr. L. L. Hodgson
Mr. A. G. Hooke

Mr. A. G. Hooke
Mr. W. E. Jones

Mr. L. L. Hodgson
Mr. A. G. Hooke

Mr. H. B. Wil-
hamson, F.L.S.

Mr. E. E. Pescott,
F.L.S.

Mr. L. L. Hodgson

Mr. C. Daley,
B.A., F.L.S.

Mr. L. L. Hodgson

Mr. C. Daley,
B.A., F.L.S.

Mr. L. L. Hodgson

Mr. E. E. Pescott,
F.L.S.

Mr. C. Barrett,
C.M.Z.S.

Mr. E. E. Pescott,
F.L.S.

Mr. E. Cox

Mr. T. S. Hart,
M.A.

Mr. P. R. H.
St. John

Mr. A. G. Hooke

Miss C. Quarter-
man

Mr. E. E. Pescott,
F.L.S.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members should bring to the Club's meetings, and, if possible, make a few remarks concerning them; also to furnish the Hon. Secretary with written particulars for record in Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

6. Reading of Papers and Discussion thereof.

(WEST AUSTRALIAN EVENING.)

1/ By Mr. J. W. Audas, F.L.S.—"Perth's Wonderland—King's Park." Illustrated with lantern slides.

2. By Mr. C. Daley, F.L.S.—"Forest and Sand Plain."

3. By Mr. F. Pitcher—"Flora of Busselton District, W.A."

Members are requested to exhibit specimens of flowers and other objects of interest from Western Australia.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a brief description thereof at the meeting.

8. Exhibition of Specimens and Conversazione.



The Victorian Naturalist:

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— OF —

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The Author of each article is responsible for the facts and opinions recorded.

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1926

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 13th DECEMBER, 1926.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS

PROPOSER:

SECONDER:

Mr. H. L. Torpy,
Alma Road,
St. Kilda.

Mr. V. Miller.

Mr. L. L. Hodgson

Dr. Cecil F. Tucker,
"Chelwood," Alma Rd.,
St. Kilda.

Mr. A. E. Keep

Mr. L. L. Hodgson

Mr. H. A. Knight,
50 College Street,
Elsternwick.

Mr. L. L. Hodgson

Mr. H. B. Wil-
lamson, F.L.S.

AS COUNTRY MEMBERS:

Mr. Basil B. P. Waller,
Glenalladale,
Via Fernbank.

Mr. E. Cox

Mr. T. S. Hart,
M.A.

Mr. James. Yeates,
Bairnsdale.

Mr. E. Cox

Mr. T. S. Hart,
M.A.

Mr. Marc. Cohen,
29 Hope Street,
Bendigo.

Mr. C. Barrett,
C.M.Z.S.

Mr. L. L. Hodgson

Miss E. Lyle,
Inverleigh.

Mr. L. L. Hodgson

Mr. H. B. Wil-
lamson, F.L.S.

AS ASSOCIATE MEMBERS:

Master Geoffrey Byrne,
27 Albert Crescent,
Surrey Hills.

Mrs. T. V. Healy

Mr. L. L. Hodgson

Master Albert Smith,
10 Lord Street,
Carnegie.

Mr. L. L. Hodgson

Mr. H. B. Wil-
lamson, F.L.S.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural specimens, should exhibit them at the Club's meetings, and, if possible, make a few remarks concerning them; also to furnish the Hon. Secretary with written particulars for record in the Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

6. Bird Evening (with special reference to the Kookaburra).
Illustrated Lecturettes by leading Ornithologists.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a short account thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

The Victorian Naturalist

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No. 516.

FIELD NATURALISTS' CLUB OF VICTORIA

The ordinary monthly meeting of the Club was held on Monday evening, November 8, 1926. Mr. P. R. H. St. John, Vice-President, occupied the chair, and about 70 members and friends were present.

The Chairman extended a hearty welcome to Miss R. S. Chisholm, who had recently returned from Canada, after an absence of two years. Miss Chisholm briefly responded.

CORRESPONDENCE.

From Town Planning Association of Victoria, inviting members of the Club to join the Association.

REPORTS.

Reports of Excursions were given as follow:—Franks-ton, Mr. J. W. Audas, F.L.S.; Eltham, Mr. W. C. Tonge; Geelong, Mr. C. Daley, B.A., F.L.S.; Hurstbridge, Mr. A. J. Tadgell; and Tooradin, Mr. H. B. Williamson, F.L.S.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Miss P. H. Patterson, Yarra Grove, Hawthorn; Miss W. Watsford, Yarra Grove, Hawthorn; Mr. A. A. Carter, Threadneedle-street, Balwyn; Mrs. R. Virgoe, Alexandra Club, Melbourne; Mr. E. J. D. Shew, Malin-street, Kew; Mr. J. E. Dowdle, Holyrood-street, Hampton; Misses Jessie and B. S. Thomson, Power-street, Hawthorn; Miss Wigan, 15 Lambeth-road, Toorak; Dr. D. Rosenberg, 343 Church-street, Richmond; Mr. Robt. O'Brien, State School, North Brunswick; and Dr. J. Kenneth Clark, 156 Collins-street, Melbourne. As Country Members:—Mr. Fred. A. Wallace, Glenalladale, via Fernbank; and Mr. C. E. Clayden, Sumner, N.Z. As Associate Members:—Master John I. Tonge, 804 Malvern-road, Armadale; and Master Roy Lyndon, 23 Rose-street, Armadale.

GENERAL.

The Hon. Secretary announced that the profit from the recent Wildflower Show at St. Kilda Town Hall was expected to be approximately £110, and that the Committee, after due consideration of the Club's financial requirements, had decided to donate the sum of £25 to the Children's Hospital.

Mr. D. Dickison suggested that the Club take action in regard to the proposal to have an area of land at

Ashburton declared a sanctuary. The matter was referred to the Committee.

PAPERS.

The evening was devoted to papers on Western Australia as follows:—

"Perth's Wonderland—King's Park," by Mr. J. W. Audas, F.L.S. The paper was illustrated by a series of lantern slides.

"Forest and Sand-Plain," by Mr. C. Daley, B.A., F.L.S., The author dealt with the physiographical and botanical features of a large area in the south-west of Western Australia."

"A Trip to Busselton and Yallinghup Cave, W.A.," by Messrs. F. Pitcher and J. Stickland. Mr. Pitcher's section of the paper dealt principally with the flora of the district, while Mr. Stickland described the formation and features of the Cave.

EXHIBITS.

By Mr. C. Daley, B.A., F.L.S.: Foraminiferal Limestone, from Batesford Quarry (near Geelong).

By Mr. J. W. Audas, F.L.S.: Dried specimens of 30 species of Western Australian plants.

By Mr. A. E. Rodda: Dacite, illustrating stages of decomposition, from Mt. Dandenong.

By Mr. A. J. Tadgell: "Brown Beaks," *Lyperanthus suaveolens*. These orchids were gathered at Ringwood on September 23. Kept fresh in water for about 6½ weeks.

By Mr. and Mrs. D. Paton: Orchids from Boronia and Mt. Dandenong—*Microtis atrata*, *M. parviflora*, *M. porrifolia*, *M. oblonga*, *Calochilus cupreus*, *Prasophyllum Frenchii*, *P. odoratum*, *P. brevilabre*, and *Caladenia congesta*.

By Mrs. Eaves: *Prasophyllum Australe*, from French Island.

By Mr. V. Miller: *Pterostylis pusilla*, from Eltham. Specimens of Western Australian timbers.

Mr. Mrs. Rich: *Pterostylis Mitchelli*, from Rushworth.

By Mrs. E. Coleman: *Calochilus cupreus*, *Sarcophilus parviflorus*, and *Prasophyllum odoratum* (various forms) from Healesville.

By Mr. F. Pitcher: "Wood pears" (seed pods) of *Xylomelum occidentale*, seeds and seed vessels of Kurrajong, *Brachychiton diversifolium*, var. *occidentale*, foliage and fruits of *Eucalyptus macrocarpa*, specimen of *Drosera Planchoni*, over 5 feet 6 inches long, flowers of *Banksia grandis* and *B. serrata*, and other specimens from Western Australia.

FOREST AND SAND-PLAIN.

BY C. DALEY, B.A., F.L.S.

*(Read before the Field Naturalists' Club of Victoria,
November 8th, 1926.)*

A party of 55 visitors to the A.A.A.S. Congress in Perth visited the Karri forests and the South-western wheat belt of Western Australia. The line generally follows the scarp of the Darling Range, a coastal range or up-lifted pene-plain. It is mainly along this range that the Jarrah, *Eucalyptus marginata*, forests occur. When passing through the more settled hills and valleys of the Jarrah country, we entered the area where the Karri, *Eucalyptus diversicolor*, is the predominant tree. The country is well-watered and wooded.

At Pemberton the Chief Mills are situated. They are chiefly supplied with Karri from the Big Brook Working Circle, eight miles distant. The tramway passes through some interesting country where, besides Karri, the Marri, *E. calophylla*, Blackbutt, *E. patens*, the Bull Banksia, *B. grandis*, and a little Jarrah also grow. We crossed the foaming Big Brook with its cascades bordered with the graceful Peppermint, *Agonis flexuosa*, and River Banksia, *B. verticillata*. The leguminous *Albizzia lophantha*, the bi-pinnate wattle, *Acacia pentadenia*, with light graceful foliage, and the Hazel, *Trymalium spathulatum*, are pleasing features of the vegetation, while the Karri Oak, *Casuarina decussata*, a handsome member of the order, with distinctively green foliage, arrests the attention.

One misses in these forests the ferns which are so striking a feature of the Gippsland and Dandenong forests. Despite the heavy rainfall, averaging here 60 inches, ferns are few in number, and there are no tree-ferns. To some extent, in the Darling Range vicinity, their absence is compensated for by the presence of the graceful Zamia Palm, *Macrozamia Fraseri*, and the profusion of Blackboys, *Xanthorrhœa*, and the less widely spread Drum-head, or Silver-head, grass-tree, *Kingia australis*, peculiar to W.A.

In heavy rain we reached the forest, where the huge Karri trees were being cut for the mills. The trees rise erectly to a great height before sending out branches almost horizontally, and the foliage is not so dense as in many of our gums. A tree recently felled was 265 feet high, the girth at 4 feet 6 inches being 33 feet.

Several species of orchids were noticed, *Acianthus*, *Glossodia*, *Pterostylis*, larger in flower than corresponding species with us. In some places the Bracken, *Pteridium*, grew vigorously.

Pemberton is about 14 miles from the Indian Ocean, and more than 100 miles from Bunbury. Some fine flowers grow in the vicinity, notably the Blue Bush, *Hovea elliptica*, and *H. trisperma*, a large *Oxylobium*, and a pretty Wax-flower, *Crowea*.

Leaving Pemberton early in the morning, we returned to Bridgetown, on the Blackwood River, through beautiful country, in the Jarrah area, frequently admiring variously-hued patches of wild-flowers growing gregariously here and there along the route. In the Blackwood River district the Jarrah grows to great size; but much has been cut out, and around Bridgetown, in and out of the ranges, there is much orchard cultivation, apples and oranges growing well. We resumed our journey, through well-wooded country, with typical Jarrah forest, relieved by the *Macrozamia*s and Blackboys. We gathered the fragrant *Boronia megastigma*, which grew in abundance at one place. Approaching Donnybrook, we passed through some weathered hills of sandstone formation. Neighbouring rocks of gneissic and micaceous formation were of interest.

One particular valley on the route was golden in colour, from the presence of *Acacias* in full rich bloom.

At Donnybrook, wild flowers were plentiful, and varied in colour. The "Native-Pear," *Xylomelum occidentale*, two species of *Persoonia*, and the Quandong, *Fusanus acuminatus*, were seen in fruit.

From Donnybrook our course was eastward, the character of the forestal covering changing with distance from the more hilly country, the eucalypts decreasing in size, and the Jarrah gradually disappearing as the country becomes more open, and the rainfall decreases from 35 inches to 50 inches in the Darling Range, to 15-25 towards the eastern plain. Plants of Leguminosae, Myrtaceae, Goodeniaceae, and Proteaceae, are increasingly numerous in species; in regard to the last-named, W.A. having 431 species against 58 in Victoria. In the preponderance of this order, which has many striking and interesting forms, there seems to be indirect evidence of closer land connection with South Africa in ancient times than with Eastern Australia. A common Eucalypt is the Wandoo, *E. redunca*, and the Marri, *E.*

calophylla, and the Mallet trees, *E. astringens*, and *E. Gardneri*, grow on the hill slopes.

Next morning found us in the South-west Wheat-belt, where the country was undulating, and xerophytic conditions were increasingly prevalent. Proceeding northward to Narrogin, we found scrub east of the town of much interest, the vegetation being markedly xerophytic in character. Acacias, Banksias and other Proteaceae were numerous, while composites, in the form of *Helichrysums*, were in profusion. Here, too, was found *Dryandra longifolia*, growing on the rubbly hill-sides in profuse bloom. A visit was made to the Agricultural Farm, a few miles distant. The country was undulating and the Eucalypts were of fair size. *E. megacarpa*, with its large and numerous seed-cases, the Swamp-Yate, *E. occidentalis*, and the Rasp-berry-jam tree, *Acacia acuminata*, grew freely. The latter is much used for fencing, being, like our Murray-pine, unattacked by white ants.

From Narrogin, in a north-easterly direction, the country, becoming drier in character, and the vegetation much less in size, assumes more of the appearance of the mallee in Victoria, with corresponding plant forms peculiar to, or resultant from, diminished rainfall. Leaving Narrogin, we travelled to Northam, then due east, over almost plain country, to Tammin. We motored about 12 miles to typical sand-plain country, formerly designated a desert—it has poor, sandy soil over slightly undulating land. Occasionally there occurs a surface outcrop of granite, indicative, in a thirsty land, of a possible soak near by. The rainfall is about 12 inches.

The characteristic of this sand-plain, bare only in small patches, is the profuse growth of small shrubs covering it for miles, the plants showing remarkable adaptation in growth, shape and structure of stems, leaves and branches to conditions of aridity, heat, and the effects of wind. In the occasional hollows, where scant moisture may sometimes gather, there may be Eucalypts, Acacias, Banksias, Casuarinas, *Fusanus*, etc., of mallee type and size; but generally, the vegetation is low and mainly of Proteaceae, Myrtaceae, Leguminosae, and Epacridaceae, and produces a floral display, interesting in variety, and strangeness of form, as well as attractive in the wealth and contrast of color.

At Merredin, on the trans-continental line, 166 miles from Perth, motor-cars were in waiting. My conveyance travelled 50 miles over fairly level country, only

an occasional worn granite outcrop rising from the plain, which in appearance greatly resembles our stretches of mallee. Frequently we passed large areas under wheat, unfenced and without habitations, the selector waiting until the harvest is gathered before erecting a wire-proof fence or a dwelling. The scrub stands close at the edge of many of these holdings, and, of course, rabbits take toll of the young wheat at first. Occasionally, beside mallee eucalypts and associated vegetation, patches of larger timber occur, containing the Salmon gum, *E. salmonophloia*, red Morrel, *E. longicornis*, and *E. gracilis*, and the twisted trunks of the Gimlet gum, *E. salubris*; also *Melaleuca uncinata*. The soil varies from that of the sand-plain to a red loam of good quality, productiveness being partly dependent upon the amount of rainfall.

Next morning most of our party diverged on another branch north-west by a loop-line to Wyalkatchem. A stop was made outside of Merredin, at a particularly fine patch of pink *Helichrysums*. The country seemed to be more open, otherwise little different—sand-plain, mallee, gimlet and salmon gum, wild-flowers in abundance. The gums of these dry areas have one feature in common, as seen against the sky-line; that is, a straight limbless stem for some distance, then a branching process like the ribs of an open umbrella, and a scanty crown of leafage, remarkably like a parachute in appearance.

Wyalkatchem is the centre of an important wheat-producing district, and types of land vary from lightly-timbered land, with Gimlet, Salmon and Morrell gums, mallee growth, low scrub, and a halophytic vegetation bordering on salt-pans. Right through this south-western belt one is struck by the evidences of vigorous development, the air of breezy optimism everywhere prevalent, the growth of towns, the fine type of settlers on the land, and the rapid transformation of the wilderness into areas of cultivation. This is the more wonderful in these vast, open spaces, where rivers and water-courses are unknown, the rainfall uncertain, and intermittent. To some extent this has been remedied by sinking wells, which may strike fresh, instead of salt, water; by careful conservation of the natural supply; and by the extension of the great Mundaring scheme through subsidiary pipes.

Leaving Wyalkatchem, on our last stage to Perth, the drier plains of promise were gradually left behind for those increasingly more verdant and better watered; our only stops being at one place to gather Kangaroo-paws by the wayside, and at another some other floral prize. Then our loop-line joined the trans-continental again at Northam, and we passed on down the picturesque and fertile valley of the Swan, reaching Perth, after our journey of 916 miles by train, and probably 150 by motor.

In a few years, with average seasons, Western Australia is destined to become the premier wheat-producing State of the Commonwealth. Her output of wool is annually increasing, and prosperity is evident on every hand. Many years ago in the United States, Horace Greeley gave the advice, "Young man, go west." To a young man from the Eastern States, with a stout heart and a small capital, in my judgment, no better advice could be given.

EXCURSION TO ELTHAM HEIGHTS.

About 36 members and friends took part in the excursion to Eltham on October 23, when the weather was perfect. We crossed the bridge to the western side of the Diamond Creek, and walked among the wooded hills and valleys, which usually are rich in "bird life." Few birds were nesting, the earlier species having their broods abroad, while the later ones were just beginning to build.

Several of the nests observed had been raided by "bush pirates," and the contents eaten or otherwise destroyed—a not unusual occurrence in "Bird Land." A nest of the Grey Thrush, *Colluricincla harmonica*, built on the ground at the foot of some saplings—an unusual place for a Thrush to build—has been robbed of newly-hatched chicks, and the nest was damaged. A nest of the Olive-backed Oriole, *Mimetes sagittata*, also had been destroyed. However, we were able to examine another Oriole's nest, which contained two nestlings, and one infertile egg. The parent birds would not show themselves. Several nests of the White-winged Chough, *Corcorax melanorhamphus*, were noted; and a flock of the birds was seen.

Among the birds most in evidence were the Rufous and Golden-breasted Whistlers, *Pachycephala rufiventris*, and *P. pectoralis*, Black-faced Cuckoo Shrikes, *Graucalus melanops*, Kookaburras, Wattle-birds, *Acanthochacra curunculata*, and other Honeyeaters, Butcher-birds, *Cracticus destructor*, and Cuckoos.

Of special interest was a pair of White-winged Trillers, *Lalage tricolor*, which had just hatched a brood of three in a nest in a fork of a Red Box Eucalypt, near the house. The birds were very trustful, especially the male, which had to be pushed off the nest when a different pose was desired by a photographer.—W. C. TONGE.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART IV.

13. *P. SUTTONI*, Rogers and Rees (after Dr. C. S. Sutton). "Alpine Leek-orchid."

Plant up to a foot in height, leaf abbreviated. Flowers, 6 to 9, white and purple, *distant on the spike*, shortly stalked, ovary stout. Lateral sepals free, narrow lanceolate, purple, darker down the middle. Petals purplish, broadly linear. Labellum on short claw, recurved, margins entire; tip broadly blunt and rounded, margins membranous, crenulated; callous portion narrow. Appendages of column large, with small ovate basal lobe.

This is a dainty, slender alpine species, and has only been recorded as a midsummer flowering plant, from the high altitudes of the Eastern Alpine mountains.

The following species (except 23) are all dwarf in character, not often exceeding a few inches in height, and are mostly autumn and winter flowering.

14. *P. NIGRICANS*, R.Br. (blackish). "Dark Leek-orchid."

A dwarf species from 2 to 5 inches high, leaf very small and usually absent at flowering, base of stem surrounded with many fibrous sheaths. *Flowers dark purple, almost black*, dense on spike, which is not 1 inch in length. Dorsal sepal erect and broadly hooded; lateral sepals free, greenish. Petals triangular lanceolate, dark purple. Labellum dark purple, glandular, oblong, narrowing to a recurved, acute tip; margins somewhat crenulate; callous portion raised, oblong. Lateral appendages to column as long as the petals, bifid; stigma oval.

A very diminutive species, but often conspicuous on account of its colour in late autumn, especially if the grass be dry. Recorded from the N.E., S. and S.W., usually growing in open grassy lands, or in open heathy moors. Found in all the Eastern States and Tasmania, flowering from April to June.

15. *P. FUSCO-VIRIDE*, Reader (dusky green). "Dusky Leek-orchid."

Dwarf; habit and size similar to No. 14. Flowers green or greenish, quite minute, on a small crowded spike; labellum dark purple, sessile. Dorsal sepal very small, green, widely lanceolate, with recurved point.

Lateral sepals, green, free, lanceolate. Petals greenish, with dark central stripe. Labellum variable from oblong to oblong ovate, on a movable hinge, tip recurved; margins entire. Lateral appendages to column, bifid, triangular lanceolate.

This is a very rare species, recorded only from the Mallee fringe, near and north of Dimboola; and also from Yorke Peninsula in South Australia. Flowers in April and May.

16. *P. RUFUM*, R.Br. "Red Leek-orchid."

Dwarf, from 5 to 8 inches high, slender; flowers very minute, closely crowded in a short spike, *reddish*; ovary small, oblong; lateral sepals free, lanceolate; dorsal sepal ovate. Labellum reflexed, *not ciliate*, lanceolar; inner plate with raised margins large. Lateral appendages to column, very small, bifid.

A rare dwarf species, recognised by its dull reddish flowers. Recorded from the East, South, and South-west. Also from Queensland, New South Wales, Tasmania, and New Zealand. Flowers in autumn.

17. *P. BRACHYSTACHYUM*, Lindl. (short-spiked). "Purple Leek-orchid."

Dwarf; flowers in a dense, short spike, greenish purple or greenish brown. Lateral sepals free, ovate lanceolate; dorsal sepal shorter and broader. *Labellum*, *oblong, hinged, not ciliate*, the inner plate thickly raised. Appendages to column, unequally 2 lobed, longer than the column.

A rare species, autumn flowering, recorded from Newstead and Ringwood. Found also in Tasmania. The flowers are much lighter than those of No. 16, and are much smaller.

18. *P. DESPECTANS*, Hk.f. (despising—i.e., insignificant). "Tiny Leek-orchid."

Dwarf, up to 6 inches in height, sometimes taller in the shade. Leaf nearly as long as flower stem. Spike short, dense; flowers very small, dark brown, red, or purplish. Lateral sepals face, *tipped with glands*. Labellum acute, narrow oblong, reddish, hinged. Lateral lobes of column entire falcate.

A fairly frequent autumn species recorded only from the South in Vic.; also from Tasmania.

19. *P. FIMBRIATUM*, R.Br. (fringed). "Fringed Leek-orchid."

Dwarf, up to 8 inches high, very slender; spike very short, flowers quite small, dull red or dull purplish red. Lateral sepals free, dilated at base; dorsal sepal short,

lanceolate. Petals somewhat streaked, acuminate. Labellum hinged, linear oblong, *dilated towards the upper end, conspicuously fringed with long hairs*. Lateral appendages of column long and bifid.

An uncommon autumn species. Recorded from all districts except the North-west; also found in New South Wales.

20. *P. ARCHERI*. Hook f. (after Archer, a botanist). "Archer Leek-orchid."

Dwarf, up to 8 inches high. Leaf small, bract like. Flowers few on an inch long spike, loosely arranged, dark red brown in colour. Lateral sepals dilated at base, *dorsal sepals somewhat ciliate on the margin*. Labellum dark purple, narrow oblong, hinged, *fringed with long hairs, tapering towards the upper end*. Appendages to column long and bifid.

Another slender autumn and winter species easily recognised by its reddish colour and marked ciliations. Recorded from the South, South-west and North-east; and also from Tasmania.

21. *P. INTRICATUM*. C. Stuart. (Flowers intricate). "Elfin Leek-orchid."

Dwarf, similar to the several preceding species in habit and growth. Flowers greenish or yellowish green, quite tiny, up to 6 on a *short abbreviated spike*. Lateral sepals lanceolate, very wide; dorsal sepal tip acute. Petals yellowish, with purple stripes and margins. Labellum broad, with recurved tip; margins entire, but sometimes crenulate; *fringed with short hairs*. Lateral appendages to column unequally bifid, *ciliate on upper half of margins*.

The marked ciliations and the short spike indicate this species. It is quite uncommon, not often being seen. It is autumn flowering; and is recorded from the South and North-east. It also occurs in New South Wales and South Australia. Sometimes the flowers are purple or dull purplish in colour.

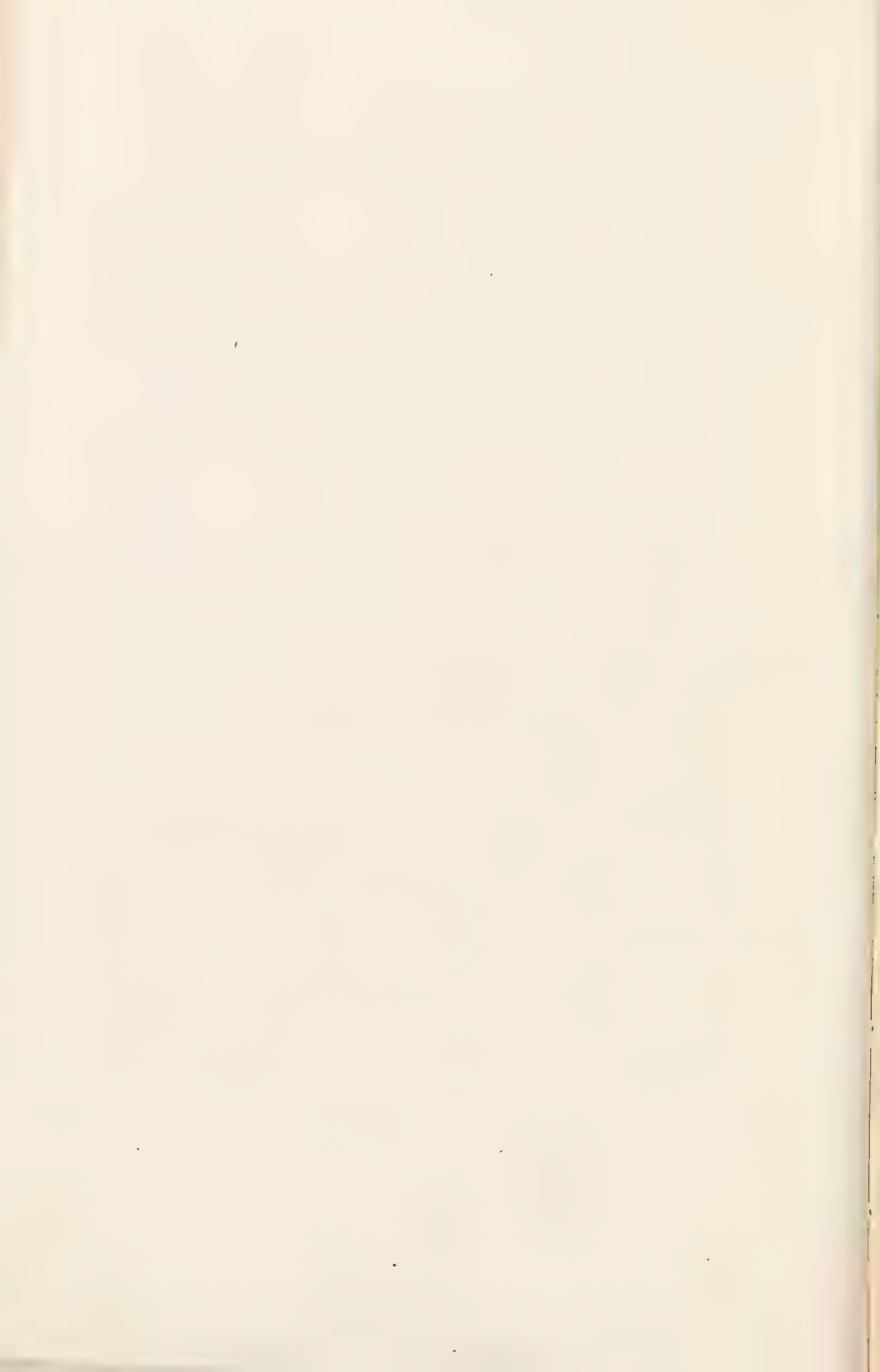
22. *P. CILIATUM*. Ewart and Rees. (Hairy). "Hairy Leek-orchid."

A very dwarf species, up to 5 inches high; leaf shorter than flowering stem. Flower spike about half an inch long. Flowers quite tiny, purplish green. Lateral sepals free, united at base. Labellum long and narrow, tip blunt, channelled down the centre, *margin fringed with short hairs*. Lateral appendages to column bifid into two short lobes, the *outer margin fringed with short hairs*.



PRASOPHYLLUM FRENCHII, F.v.M.

"Stout Leek-orchid."



A very rare winter species, quite small and recorded only from Green Valley, in the county of Talbot, where it was collected by F. M. Reader in 1910.

23. P. DIXONI, F.v.M. (after J. E. Dixon, a Victorian naturalist). "Golden Leek-orchid."

Leafless at time of flowering. Tall, up to 9 inches in height. Flowers few, medium size, close together, yellowish green or yellow. Lateral sepals united, broadly lanceolar. Petals finely pointed. Labellum broadly ovate, *not fringed, but faintly ciliate*, or somewhat finely denticulate towards the summit. Lobes of labellum short and bifid.

This very rare species was found in 1892 by C. French, Jr., and named after his friend. The locality is recorded by Mueller as "Near Kardinia Creek," but it really should be Oakleigh District. It has but the one locality; and has been collected only two or three times. It is conspicuous by its yellow colour, growing usually in heathy tea-tree country.

5. CALEANA, R.Br.

(After G. Caley, an early collector of New South Wales plants).

Flowers reversed. Perianth segments linear. Dorsal sepal incurved, lateral ones spreading or reflexed. Labellum articulate on a movable claw, with the base of the column; the lamina ovate or oblong, peltate, its surface smooth, convex, or tuberculate. Column long, broadly 2 winged. Glabrous terrestrial herbs with solitary, narrow, linear leaf. Flowers from 1 to 4 on thin slender stems.

This remarkable genus is limited to Australia and New Zealand, and has only four species, three of which occur in Victoria. The flower, when fully expanded remarkably resembles a wild duck in flight, the head and bill of the duck being the labellum, the two broad wings of the column representing the body of the bird. The labellum (head) is quite definitely irritable, and if the end of the column (bill) be smartly touched the labellum will spring inwards, folding itself in between the wide wings of the column. After twenty minutes or half an hour have passed, the labellum opens out once more.

1. C. MAJOR, R.Br. (larger). "Large Duck-orchid."

Slender, glabrous, from 6 to 12 inches high. Leaf radical, narrow lanceolate, about 2 inches long, both leaf and stem usually purplish red, stem somewhat wiry. Flowers one to three on stem, *reversed*, purplish or red-

dish brown, often tinged with green when young. *Lateral sepals and claw of labellum inserted at the base of the column, surface of the labellum quite smooth.* Column incurved, broadly winged from anther to base.

The large duck-orchid is a unique species, and has been recorded from all districts but the North-west. It is sparsely distributed, and on account of its dull colour, is not readily noticed. The irritable character of the labellum is readily seen; the purpose being that an insect is readily imprisoned, and so fertilization results. It is also recorded from Queensland, New South Wales, South Australia and Tasmania, flowering in November.

2. *C. MINOR*, R.Br. (lesser). "Small Duck-orchid."

Very slender, glabrous, 3 to 7 inches high. Leaf solitary, radical, very narrow linear, about 1 to 2 inches long. Stem wiry; stem and leaf dull purplish green. Flowers about half the size of No. 1, *reversed*, 1 to 6 on stem, reddish brown, occasionally greenish, on slender pedicels. Labellum peltate. *Lateral sepals and claw of labellum inserted at the end of a foot or basal projection of the column; surface of labellum tuberculate.* Column widely winged as in No. 1.

The Small Duck-orchid is readily recognised by the several quite small flowers, with the roughened or tubercular surface of the labellum (duck's head). The labellum is irritable, as in *C. major*. It is not so common as the former species, and is recorded from the south, south-west, and east. Flowering in November. Recorded also from Queensland, New South Wales and Tasmania.

3. *C. SULLIVANII*, F.v.M (after D. Sullivan, a Victorian botanist.) "Spectral Duck-orchid."

Stem very slender, short. Leaf small, narrow linear, plant only a few inches high. Flowers, one to three on stem, very small. Labellum broadly lanceolar ovate, pointed at the summit, similar in form to both the former species, *beset with papillular glands towards the centre*, not attached in a peltate manner, the margin free of tubercles: membrane of the column terminated on each side by a small deltoid lobe.

This is a very rare species and has been found only two or three times, on the Grampian mountains. The difference is in the unusual form, and structure of the labellum. It is an early summer flowering species.

6. *SPICULAEA*, Lindl.

Sepals and petals linear, dorsal sepal erect. Labellum articulate at the base of the column and movable with a

linear claw. Column long, *wingless except for two acute subulate or falcate auricles on each side*, foot usually conspicuous. Usually leafless at time of flowering. Stem somewhat fleshy; flowers several, sometimes apparently reversed.

This genus has been known for many years under the name of *Drakaea*. The separation from that genus was very necessary, owing to the differences in the structure of the column. In *Drakaea*, the auricles or wings to the column are broadly and bluntly triangular, and are situated near the base of the column; while in *Spiculaea* the auricles are acutely, long triangular in shape and pointed, being placed towards the top of the column. The two Victorian species are now under *Spiculaea*. There is a third species recorded from West Australia.

1. *S. IRRITABILIS*, Reich, Schltr. (irritable). "Hammer-orchid."

Stem from 6 to 9 inches high, leafless at time of flowering. Flowers 3 to 8 on pedicels within small bracts. Flowers small, greenish, tinged with red. Sepals and petals narrow linear, dorsal sepal exceeding the other segments. Labellum articulate at the end of the basal projection, having a linear claw, the lamina hammer-shaped, and peltately attached, ciliate with long hairs on the upper surface, the upper lobe emarginate, or terminating in a short smooth point, the lower lobe or appendage being hairy.

Only one specimen has been collected in Victoria, and that many years ago from East Gippsland. The specimen was lost, so the species is not now represented in the National Herbarium. This species is retained in Victorian lists on the evidence of Mr. C. French, Jr., who was attached to the Herbarium at the time of its receipt, and who well remembers Baron von Mueller receiving it. The movable hammer shape of the labellum is remarkable and distinct.

It is recorded also from New South Wales and Queensland, and is an early summer flowering species.

2. *S. HUNTIANA*, F.v.M. (after R. Hunt). "Elbow-orchid."

Leafless at time of flowering, from 3 to 6 inches high, with two clasping stem bracts. Flowers reddish green, two to seven on slender pedicels, each pedicel embraced by a blunt bract. Sepals and petals narrow linear. Column having the typical auricles of the genus. Labellum articulated on a movable joint (elbow) to a linear

projection of the column: divided at the end into two long narrow divergent tail-like ends, which are generously supplied with long purplish hairs. There are two anterior processes, claw-shaped, each terminating in a round, shining, knob-like gland. This end works on the elbow joint, fitting in to, and clasping the column.

This remarkable and very rare little orchid has only been found in Victoria at Cravensville (A. B. Braine), near Tallangatta, flowering in November and December. Mueller records it from Mount Tingiringi, in New South Wales, as an autumnal species. It is also recorded from Blackheath, in the Blue Mountains. It is stated by Mueller that the labellum is irritable. Recent observations have failed to detect any irritability; possibly Mueller mistook the movable hammer-like action for an irritation action.

7. CHILOCLOTTIS, R.Br.

(Beautiful Tongue).

Low terrestrial herbs, with two radical leaves, or nearly so. Dorsal sepal erect, concave, incurved, contracted at the base. Labellum on a very short claw, broadly ovate or obovate, conspicuous, beset with variously arranged calli, often stalked, or with tubercular calliosities. Flowers green, greenish or purplish.

There are eight species in the genus, seven being Australian. Two also occur in New Zealand, one of which is also Australian. Five species are recorded for Victoria. The plants are all dwarf, and the conspicuous labellum is usually very beautiful. The plants are all one-flowered.

Petals reflexed—Species 1 and 2.

Petals spreading or ascending—Species 3, 4 and 5.

1. *C. REFLEXA* (Labill.), Cheel. (*C. diphylla*) (reflexed-perianth). "Autumn Bird-orchid."

Labellum usually obovate, on a short claw; a few stalked calli on the end of the claw; a large, usually green callus at the base of the lamina; many crowded variously shaped calli in front of the large one, extending almost to the tip. Column about as long as the petals.

This species was formerly known as *C. diphylla*. This name is not at all apt, as all of our *Chiloglottis* have two leaves. It is usually an autumn flowering species, about four inches high, but flowers are frequently found in winter and spring. It is a cool climate orchid, being

Plate XII.



CHILOGLOTTIS GUNNII, Lindl.
"Common Bird-orchid."



MICROTIS ATRATA, Lindl.
"Swamp Leek-orchid."

PRASOPHYLLUM NIGRICANS, R.Br.
"Dark Leek-orchid."

recorded from the South, East and North-east, usually growing in shaded places.

Recorded also from Queensland, New South Wales, and Tasmania.

2. *C. TRAPEZIFORME*, Fitz. (Labellum trapeze-shaped).
"Broad-lip Bird-orchid."

Labellum rhomboid or trapeze-shaped, on a short claw; no calli on the claw; lamina with a single large, stalked compound brown callus near the base. Leaves two; plant only a few inches high.

A widely distributed, but not common species, growing in cool districts, recorded from the South, East and North-east. Found also in New South Wales.

3. *C. GUNNI*, Lindl. (after R. Gunn, a Tasmanian botanist). "Common Bird-orchid."

Flowers, the largest of the genus, reddish brown. Labellum broadly ovate, large. A large, brown, stalked clavate callus at the base, and a short, thick, almost sessile glant in front of this near the centre; then a somewhat irregular row of small stalked calli on each side of these. Calli frequently crowded.

A common species often found in great colonies, flowering in early spring. Recorded from all districts except the North-west, and usually abundant in mountain areas. Occasionally a colony will be found growing on the trunk of a tree-fern.

4. *C. MUELLERI*, Fitz. (after Baron von Mueller).
"Green Bird-orchid."

Flowers always green, growing upon tree-ferns. Labellum ovate or broadly lanceolate, on a very short claw. Lamina with shortly stalked or sessile brownish or green calli irregularly grouped in centre and at the base.

This green-flowered species is recorded only from the South, and there only from the Dandenong Ranges and adjacent localities. Fitzgerald records it as originally collected on the Loddon River by C. French, Senr. Mr. French states that this is an error. His specimens came from the Dandenongs. I consider this species to be practically an epiphyte. It is rarely found growing in soil, usually being seen in colonies on tree ferns. When seen growing in the ground, it has settled there from a fallen tree fern, and then the flowers are not nearly so large as when seen on the ferns.

5. *C. PESCOTTIANA*, Rogers (after E. E. Pescott).
"Alpine Bird-orchid."

Flowers medium size, 3 to 7 inches high, greenish bronze. Labellum oblong, rounded at tip, on a very short claw; one large crescent shaped sessile callus in centre, and in front of others, another large, bilobed stalked callus about midway between this and the base of the lamina; numerous stalked calli variously sized, often small, between these two groups; a somewhat irregular row of small calli running on either side of middle line from bend of lamina to its base.

This is a very rare species, found only at Cravensville in the North-east, near Tallangatta, and collected by A. B. Braine.

In his paper on "The Orchids of Victoria," Part II., in the October *Naturalist*, Mr. E. E. Pescott states that the "Scented Sun-Orchid," *Thelymitra aristata*, Lindl., is "recorded from all districts but the north-west." In October, 1912, I sent a small collection of orchids from Sea Lake, in the north-western mallee district, to Dr. R. S. Rogers, who identified them as follows:—*Thelymitra aristata*, *Pterostylis rufa*, *P. nutica*, *Caladenia carnea*, *C. dilatata*, *C. tentaculata*, *Prasophyllum fuscum*.—J. C. GOUDIE.

CUP MOTH AND GUM LEAVES.

Even field naturalists pardon Eve for bringing Eucalyptus foliage into her home. But there is a tiny enemy, 1 inch by 3-16ths inch only, lurking nearby, which should be watched for. Recently, among the hills of Whittlesea, while I was finding my 100 floral treasures, my wife was engaged collecting gum-tips. She called out in pain, and found that her fingers had come in contact with the spines of the larva of the Cup Moth, *Doratifera Oxlei*. In the absence of ammonia, I applied an alcohol, and permanganate of potash, but the nettle- or ant-like stinging remained for three hours. The Cup Moth larva lies flatly, gluing its mouth to the edge of the leaf, as can be seen when the leaf is turned over, but it does not look the aggressor it is. On the back behind the dark shield-like skin are two crossed lines, in which are two pairs of circular bristle processes, corresponding in position with the double pair of bristle processes at the hind part of the caterpillar. These are all simultaneously erected, but are otherwise immovable when the larva feeds in its natural state, or is irritated. When it is normal, or feeds in captivity, the processes severally fold into lined triangles in cavities on the back, and turn inward. Adjoining the spines are brilliant scarlet triangular patches. Mr. J. A. Kershaw kindly identified the Cup Moth larva for me.—A.J.T.

A few complete sets of Mr. H. B. Williamson's valuable papers on Victorian Ferns (reprinted from "The Naturalist") are available; price, 2/6 per set.

NESTING HABITS OF THE WHITE-BACKED
MAGPIE.

BY D. DICKISON.

The White-backed Magpie (*Gymnorhina hypoleuca*) is extremely plentiful in the open areas of Southern Victoria, where it is not unusual to see flocks of 30 or 40 birds during the autumn and winter months. With the approach of the breeding season, these flocks separate into pairs, which seek suitable places for rearing their young. Though Magpies usually are bold and fierce in nesting time, at the nest they are shy birds, and very few nature photographers have succeeded in obtaining pictures of their home life. This season I attempted the difficult task of photographing a pair that had their nest in a large tree, at Ashburton.

The nest was situated in a fork of a branch 57 feet from the ground, and when found, on August 1st, had every appearance of being completed. The continuous absence of Magpies led me to believe that the nest had been forsaken. Three weeks later, however, it was noticed that, when other Magpies perched in the tree, they were immediately driven away by another pair, which came from neighboring trees.

On September 11th the female was brooding. When disturbed she would remain away for a few minutes only. Two days later, with the aid of rope slings, I climbed the tree, and found that the nest contained two birds a day or two old, and one egg on the point of hatching. Up to this time the adult birds had been fearless; it was not until September 15th, when I had fastened the camera to a branch near the nest, that their shyness became apparent. That afternoon passed without either bird coming to the nest, although, at times, they would perch near the camera, and look into the nest to see that all was well with the nestlings. By this date the other egg had been hatched, and all three nestlings were sparingly covered in soft dark down.

The nest was in an ideal position for photographing, as it was possible to place the camera on another branch, 8 feet away. To make an exposure, I attached 40 yards of thin fishing line to the shutter release, then concealed myself that distance from the nest. Sometimes the wind was so strong that the pressure on the line was sufficient to release the shutter; and in this way several plates were spoiled.

Undaunted by failure, I resolved to spend the following week-end at the nest, and accordingly the camera was fixed opposite the nest shortly after mid-day on Saturday. In the meantime, the birds had lost none of their shyness, and all that afternoon, until almost dusk, they remained away from the nest. They were usually feeding on the ground near the nest-tree, or, perched, watching me from another tree, 200 yards away. The camera was left in position that night, and by 6 a.m. next day I had arrived at the scene again. The adult birds were then busily engaged in feeding the hungry brood; but after my arrival they declined to visit the nest. That it was my presence, and not the camera, that kept them away is shown by the fact that, whenever I walked to other parts of the paddock, the parent birds would instantly go to the nest. To conceal myself, I built a bower of green gum branches; but the male Magpie was able to perceive me through any small opening, and would remind me of my presence by swooping swiftly over the bower. The sight of the Magpie is wonderfully keen. The remainder of the day passed without the adults visiting the nest.

By September 30th the young birds were partially feathered, but still far from being ready to leave the nest. Once again, on October 9th, the camera was placed near the nest, and again the result was failure. The nestlings had grown considerably within the week, and the eldest was able to stand on the side of the nest and flap its wings. As on the previous occasion the camera was left at the nest overnight, and I was "on duty" at dawn next morning, when I found the female on the nest. After waiting for three hours I heard the young ones calling loudly, and at the same moment one of the adults settled on the edge of the nest, but remained only for an instant. After a further interval of an hour the bird came to the nest again when I was able to take a photograph of it in the act of feeding its young. Afterwards, throughout the day, visits by the parents were made at irregular intervals, and further pictures were obtained. The approach of the parents was usually heralded by the calling of the young, and thus I could be in readiness to release the camera shutter when one settled at the nest.

I devoted the afternoon of October 13th, the whole day on the 14th and 17th, and the afternoon of the 19th, to

Plate XIII.



White-backed Magpie at Nest.

[Photo D. Dickison.]

photographing this pair of birds. In all $6\frac{1}{2}$ days were spent in working at this nest, and during nearly the whole of that time the weather was unsuitable for my purpose. After October 10th the birds lost all fear of my presence, and came to the nest most regularly to feed the young ones. Just prior to the time when the young disappeared, the male would attack me very fiercely as I climbed the tree to change a plate, or take the camera down. As a rule, it is only after the hatching of the eggs that Magpies adopt bold tactics, attacking all persons who venture too near the nest-trees.

The eldest nestling obtained most of the food that was brought to the nest, and in consequence developed more quickly than the others. The youngest proved to be a weakling, and on October 17th it was found dead under the tree, having been crowded out of the nest by its robust companions. On this date the eldest fledgling exhibited a great desire to leave the nest, and would flap its wings in anticipation of flying. On October 19th it had gone, and was not seen with the parents, who were busily engaged in feeding the remaining young one, which had disappeared on October 26th. According to these records, young Magpies remain in the nest a few days more than five weeks.

Generally, the nest of the Magpie is a large, bulky structure, but this nest was very small, quite unfitted for holding three large fledglings. Nests may be built in almost any kind of tree, and in some cases telegraph posts are selected as sites; or, as in certain Gippsland districts, the tops of tall tree-ferns—when the new season's fronds appear the nests are displaced, and usually blown to the ground in the first wind storm.

Magpies have been known to nest in the same tree every season for many years; any other Magpie trespassing in their domain being quickly attacked and driven away. In many cases, these birds appear to have their own territories, over which they hold sole control, but, contrary to this theory, I know a paddock at Lilydale, where several pairs breed in trees only a few hundred yards apart, and seem to rear their broods in harmony.

That all Magpies do not nest annually is proved by the numerous small flocks that are seen around Ashburton, and elsewhere, during August and September, the principal breeding-months for the species.

THE KING'S PARK, PERTH.

BY J. W. AUDAS, F.L.S., F.R.M.S.

*(Read before the Field Naturalists' Club of Victoria,
November 8th, 1926.)*

King's Park, an area of 1,018 acres, is situated on the heights of Mount Eliza, overlooking the City of Perth, and the Swan River. Excepting small portions, the Park is virgin bush land, and wildflowers grow abundantly in their native habitat.

As one enters the Park at the main gate, a fine stretch of road is seen, with flowering gums, *Eucalyptus ficifolia*, on either side. These trees, in the blooming season, appear as a blaze of fire for a distance of three-quarters of a mile. Some bear blooms of the brightest red; others flowers in shades of terra-cotta, where from the road overlooking the river, a magnificent view is commanded, scenic beauties are added to by large patches of wild flowers; the Swan River Myrtle, *Hypocalymma robustum*, an elegant shrub from 1 ft. to 3 ft. in height, with erect, rigid, slender branches, and flower spikes of a lovely shade of purple-crimson; Rush Lily, *Sowerbaea laxiflora*, a graceful plant, with rush-like leaves, and clustered umbels of pretty mauve-pinkish flowers, sweet-scented. Wild Violet, *Hybanthus calycinum*, a small shrub with purple flowers, the flattened petals sometimes very pale in tint, and suspended from a tiny bell-shaped calyx; Poison Shrub, *Isotropis striata*, a small shrub with yellowish-brown flowers, streaked with crimson; and Milk-maids, *Burchardia umbellata*, springing up everywhere.

Continuing along the road, a sample of the bush as it covered the whole of the mount in its virgin state is passed through. No attempt at artificial improvement has been made, or is intended to be made. The area is reserved for the native flora, which, in the season, is beautiful and varied in colour and form. Rioting among the tall shrubs and trees are three handsome climbers: the Coral Pea, *Kennedya coccinea*, with its large pink masses of flowers; *Spurious Sarsaparilla*, *Hardenbergia Comptoniana*, a hardy evergreen twiner, which literally covers in a mantle of purple the shrubs and undergrowth on which it loves to spread, and West Australian Clematis, *C. aristata*, var. *occidentalis*, tall and bearing trailing masses of fluffy white flowers, and clinging to any available support by means of the leaf stalks, and twining round any object they touch.

At the foot of a steep declivity the road turns to the right, and thence there is a sharp rise through virgin

bush. Presently a triangle is reached which forms the junction of the three roads, one being the main drive, the second, via Fremantle, and the third, the May Drive. A journey down the steep hill and back is especially interesting to the botanist. The following plants may be noted: Peppermint tree, *Agonis flexuosa*, a myrtaceous tree, with dense drooping foliage and white flowers—the leaves, when crushed, having a strong perfume resembling peppermint; Shaving-brush Flower, *Dryandra floribunda*, a bushy proteaceous shrub, from 4 ft. to 8 ft., with numerous creamy-yellow flowers, which are stiff and spiky—in bud, the flower closely resembles a shaving brush; *Cryptandra arbutiflora*, a rhamnaceous shrub, with twiggy branches and fragrant white flowers; *Ricinocarpus glaucus*, an erect glabrous shrub, two feet in height, with white, waxy flowers, it belongs to the Euphorbiaceae. Here numerous species of leguminous plants abound and brighten the Park with glowing masses of yellow and red, namely, *Acacia pulchella*, an elegant shrub, from 6 ft. to 8 ft., with pinnate leaves and glorious drooping clusters of golden blossom; *A. cochlearis*, a rigid shrub of several feet, with globular yellow flower heads; *Oxylobium capitatum*, a shrub of 3 ft. or 4 ft., with orange and red flowers; *Jacksonia Sternbergiana*, an erect shrub of about 6 ft., with drooping branches and yellow flowers; *Daviesia juncea*, a glabrous undershrub, with small yellow and red flowers; *D. horrida*, an erect shrub of several feet, the flowers are red and orange; and *Chorizema ilicifolium*, a small weak shrub, with slender branches and flowers of orange and red.

Flowers of different shades of blue abound. *Leschenaultia biloba*, a beautiful celestial blue, is seen on all sides. This species is considered by many to be one of West Australia's most handsome wildflowers. Here also is found the Blue Tinsel Lily, *Calectasia cyanea* and Nodding Blue Lily, *Styphandra glauca*. These plants are familiar to Victorians, as they grow luxuriantly in the Grampians and other parts of this State. Many interesting orchids abound in the Park, as *Glossodia Brunonis*, *Prasophyllum Fimbria*, *Microtis alba*, *Pterostylis vittata*, *Thelymitra villosa*, *Caladenia discoidea*, *C. Menziesii*, *C. Patersoni*, variety *longicauda*, and *C. flava*, which grows freely throughout the Park.

The May Drive was planted in honour of soldiers and sailors who fell in the Great War. The trees are

Oriental Planes, and to each is affixed a cast-iron plate bearing the name of a deceased soldier, the number of his regiment, and other details. Passing by the Subiaco turn-off, the First Honour Avenue is entered. Here the most of the trees are British Oaks. A grass circus is encircled with native trees, principally Eucalypts.

There are miles of pathways leading to various points in the Park; some are steep, and a rapid drop of 250 feet to the river road may be made. Hackett's Path descends through a series of grottoes, artificially formed of stones and coral, to the terraces below. Another beautiful path has a branch to grottoes and end on the terrace below. En route, the visitor passes through what is known as the "Lover's Walk," and crosses a miniature canyon, which, at one time, was watered artificially, but in recent years has been dry, owing to shortage of water.

Among conspicuous flowers in the Park, the Kangaroo Paws probably are the most interesting. Magnificent specimens of two species grow in profusion. They are the Red and Green Kangaroo Paw, *Anigozanthos-Manglesii*, and the Small Orange and Red species, *A. humilis*. Other favourite wild flowers growing in the Park, are:—*Hovea trisperma*, a small shrub of about 18 inches, a very handsome plant, with beautiful purple flowers; *Conostephium pendulum*, a small Epacridaceous shrub, with white flowers tipped with pink, seen on all sides; *Hypocalymma angustifolium*, an elegant, erect, bushy plant, about 2 ft. in height, with pinkish flower spikes; *Trichinium Drummondii*, a perennial plant, with purplish-pink flower-heads, often known as "Everlasting"; *Eriostemon spicatus*, a small, heath-like shrub of about 2 ft., with pinkish flowers in loose terminal spikes. *Lysinema ciliatum*, an erect shrub, 2 ft. in height, with slender branches, and white, star-like flowers, *Dampiera linearis*, a small shrub of about 18 in., with coerulean blue flowers; and *Pimelea sulphurea*, a handsome shrub, 2 ft. in height, with nodding flower-heads of a pale yellow colour.

The "Swan River Fern Palm," or "Zamia Palm," *Macrozamia Fraserii*, which is dispersed throughout the Park, adds a picturesqueness to the landscape, and seems to fill the place that tree-ferns occupy in our State. The forest trees of the Park, growing in their native habitat,

comprise Jarrah, *Eucalyptus marginata*; Marri, or Red Gum, *E. calophylla*; Tuart, *E. gomphocephala*, and *Bankisia attenuata*, the latter is very plentiful throughout the Park.

Occasionally fires break out in the Park and destroy considerable portions of the native vegetation, but every precaution is taken to prevent these occurrences.

EXCURSION TO FRANKSTON.

On October 16th 31 Club members and friends, including the Rev. George Cox and ten juveniles, members of the Mornington Naturalists' Club, visited Frankston. In the Park Reserve, familiar shrubs were seen in full bloom, viz.—*Aotus villosa*, *Pimelea octophylla*, *P. humilis*, *Epacris obtusifolia*, *Dillwynia floribunda*, *D. cinerascens*, *Bredemeyera ericinum*, *Hibbertia acicularis*, *H. stricta*, *H. fasciculata*, *H. densiflora*, *Leptospermum myrsinoides*, *L. scoparium*, *Daviesia ulicina*, *D. corymbosa*, and *Ricinocarpos pinifolius*. After walking a mile through heathy country and sandy rises, we reached the Sweetwater Creek. Along the banks Scented Paper Bark, *Melaleuca squarrosa*, and Swamp Paper Bark, *M. ericifolia*, were in gorgeous bloom. Nearby a number of small plants were gathered, the Purple Bladder Wort, *Utricularia dichotoma*, Tiny Bladderwort, *U. lateriflora*, Pink Bladderwort, *Polypompholyx tenella*, and Hairy Stylewort, *Levenhookia dubia*.

Proceeding over Mount Eliza, we noted the beautiful Purple Eyebright, *Euphrasia collina*, and Grass Trigger Plant, *Stylidium graminifolium*. Mr. A. G. Hamilton, who has made some observations on the pollination of Trigger plants, noted that the usual time for the column to remain sprung is from 10 to 20 minutes, then it rests for from 20 minutes to four hours. The weather affects the movements of the column; it is inactive when it is cold or moist, but works well on warm dry days, when insects are also more numerous.

About a dozen species of orchids were seen during the afternoon, including *Caladenia Menziesii*, *C. Patersonii*, *C. dilatata*, *Microtis perrifolia*, *Thelymitra flexuosa*, *T. antennifera*, *T. carnea*, *Diuris longifolia*, *D. sulphurea* and *Cyrtostylis reniformis*.—J. W. AUDAS.

A pair of White-browed Scrub-Wrens, *Sericornis frontalis*, nested, this season, in a latticed room, that was intended for a fernery, but holds boxes of rubbish. The nest is among the scraps of ribbons and silks and lace in a lidless hat-box.—C. C. CURRIE, Lardner.

Victorian botanists will be interested to learn that Mr. J. M. Black's "South Australian Flora," part 3, which has been long looked for, is in the hands of the "Proof Reader,"—A.J.T.

FOSSIL DISCOVERIES AT MORNINGTON.

During the last few years the Rev. Geo. Cox has gathered a little band of young enthusiasts in nature study, and the Mornington district, where they make their excursions, has proved over again how rich a store of knowledge lies there to hand, not only in botany and zoology, but also in its rocks and fossils. The leader himself has contributed many a fine and unique fossil specimen to the National Museum Collections. One of the more recent donations is a new species of the limpet-like *Montfortula* that will presently be described.

One of Mr. Cox's pupils, Mr. Colin Sache, has also recently found, and presented to the Museum, a unique fossil plant stem belonging to the "Horse-tail" group, or Equisetales. This fossil was found in the small outcrop of Jurassic sandstone, which occurs on the beach between Frankston and Grice's Creek. The fossil stem shows quite distinctly the joints whence sprang a series of leaflets forming an encircling sheath. On the stem itself are impressed other tiny circlets of leaves, as if they had been rubbed off the smaller branches, when the plant was inundated with the brown slimy mud. This plant fossil may be indeed related to the fossilised creeping roots with nodules of a similar plant that I discovered, some years ago, in the Jurassic beds of South Gippsland.

Another remarkable discovery has been made—this time among the Tertiary shells of Balcombe Bay—by another member of the Club, Miss Mary Evans. The fossil in question is distantly related to the cowries. It is a small, spindle-shaped shell, about three quarters of an inch in length. Although it is a sea-snail, its spire lies hidden within the shell, and its mouth extends the whole length. The name given to this shell is *Simnia exigua*. In trying to trace the meaning of the genus name, *Simnia*, some doubts arise as to the original spelling, which seems to have been *Scymnia*; and if so, it refers to the thicker body and narrower extremities, which may have given a fancied resemblance to a dog-whelp (compare *Scymnus*, the Spiny Dog-fish.)

Simnia exigua has never before been found at Balcombe Bay, but there are other specimens of this shell in the Museum, from Clifton Bank, Muddy Creek, Hamilton; so that the discovery made by our young field naturalist is of much value to those who are studying the ages of our fossil beds and who are attempting to find their relations to one another in the geological scale.

—F. CHAPMAN.



THE RED WATTLE-BIRD'S WAYS.

Excepting the farmer and grazier, to whom the Red Wattle-bird (*Anthochaera carunculata*) renders valuable assistance in keeping destructive insects in check, there are few who have a good word to say for this species. It is looked upon with suspicion by the fruitgrower, who is undecided whether to regard it as a friend or a foe; and being a bird of sombre plumage, with harsh, unattractive notes, it is not admired by the general public. I fear that, in some districts, even the bird-lover is unable to approve of the Wattle-bird's ways.

On Sperm Whale Head this bird is extremely pugnacious, and keeps its haunts free from most other species; for this reason it is not a favorite with the bird-lover here. The following notes are from personal observations in this locality.

During most of the year the Red Wattle-bird is not abundant; a few pairs, here and there, breed in the district, usually they associate in small colonies—up to about six pairs—each colony having a limited area from which its members never wander. But in autumn very large, wandering flocks of Wattle-birds are seen, especially at the end of the Head, where they are checked by the expanse of water that confronts them. These, I presume, are mostly young birds, from neighboring districts, which, driven away by their parents, are seeking pastures new. They do not cause any trouble among other birds, but fly from tree-top to tree-top, and circle high above, in preparation for the continuance of their flight. Their numbers gradually decrease, until, finally, only the “stationary” pairs remain. It is these pairs that have acquired the disagreeable habit, previously mentioned, which is especially noticeable during the nesting season.

This year three pairs have nests within sight of our house. They are quite friendly among themselves, but very few other birds can remain unmolested, near their breeding haunts. Most small birds—as Robins, Thornbills, Wrens, and Flycatchers—are driven back if they venture too close, while larger species—Black-faced Cuckoo-shrikes and Friar-birds, for instance—are chased away. The Wattle-bird will even annoy the Kookaburra by nipping at his tail as he flies past; and it is extremely jealous of other honey-eating species. It is aggravating, to observe some rare bird being ruthlessly driven away by a familiar species.

The territory governed by the three pairs of Wattle-birds comprises about nine acres surrounding our house—a Banksia clump in front being one of their favorite haunts. A few other birds, such as a pair of Magpie-larks and some Pardalotes, are permitted to be part-owners of this area; and there are others, such as Magpies and Currawongs, which enter the Wattle-birds' haunts in

search of food, but are too large and fearless to be forced to leave them. The Rainbow Lorikeet is a courageous little bird; recently a few alighted in the Banksias and were immediately attacked by a pair of Wattle-birds. The intruders, however, proved to be equal to the aggressors in both strength and ferocity. I was pleased to see the Wattle-birds defeated for once, especially by smaller birds.

Lately, a male Wattle-bird has been taking crumbs from my food-tray, and apparently has the impression that the food is put there for his benefit only; nowadays, other birds can procure a meal only when the Wattle-bird is not watching. Very soon, he may be the only visitor to the tray. Species that are able to hold their own against the Wattle-birds are few indeed compared with those that are prevented from feeding or nesting about our house. Were Wattle-birds absent from Sperrn Whale Head, many other species would be happier. But it is hardly just to judge a species from observations in one locality. I have wondered whether this contentious disposition of the Wattle-bird has been noticed by other observers. Maybe the few pairs here are unusually aggressive.—FRED. BARTON, JNR.

BIRDS IN A MALVERN GARDEN.

That our suburban gardens may provide food and nesting-sites for many different birds, is shown by a garden chronicle kept by Miss Joan Harper, of Avalon-road, Malvern. Her list stands at 39 species (with a query at 40), and many have nested in the pleasant territory, composed of several large neighbouring gardens with wide lawns, and high, sheltering hedges.

The latest arrival is a Rufous Fantail, *Rhipidura rufifrons*. "A new recruit for my garden brigade, and a lovely one, too!" Miss Harper writes, "appeared at about 7 o'clock in the morning. The sounds of an unfamiliar bird song, made me wake up more quickly than a hundred alarms! Next minute I was out in the garden, and there saw a charming Rufous Fantail, playing about in the Chestnut tree. The sun was shining right on him, and thus showed up his colours to perfection. An English Thrush is building in our big, creepered-trellis, on the side path; and a blackbird, in the next garden, has laid a second clutch of four eggs in the nest she used before. The Crimson Parrot is still about, and to-day I heard Brush Wattle-birds. Silvereyes and Blue Wrens were here a few days ago, and I heard the first Spinebills calling—they went away when the nesting season commenced."

ABNORMAL GROWTHS IN PLANT LIFE.

There are few students who do not keep preserved in spirit, or in some other way, specimens labelled "monstrosities," or "abnormalities." The botanist has his folder, containing distorts and specimens of fasciation or teratology.

When the plant is in full growth, it contains a number of ferments, or enzymes, so that, as Scott Elliot observes, in the wonderful chemical laboratory, something may happen to influence the delicate balance of supply and demand in the life of the plant and the proportion and nature of its various ferments. Sometimes the lower part of the stem is undivided, and will, about midway or higher up, branch out into two similar parts. Thus

we see unification and separation. The superabundant nutrition will produce a diseased condition giving rise to a growth that destroys the balance of expansion. Fasciated stems appear as isolated cases among other normal plants growing under precisely similar conditions.

Recently, at West Kinglake, where the Onion-leaf Orchid, *Prasophyllum brevilabre*, was the predominant plant in flower, specimens ranged in height from 6 in. to 16 in. Double flowers were by no means uncommon. One robust specimen was a branching form, quite 16 inches high; half of it bore flowers. A branching *Prasophyllum* is a great rarity, and this one branched 2½ inches from the apex of the spike. Below the branch, fine flowers appeared in regular rows around the stem, giving it a pretty and uncommon appearance. Ordinarily, the flowers are arranged alternately up the spike. Nature had evidently intended this plant as a Siamese twin, but had relented.

Another abnormality I found at Ringwood some time ago, in two of a number of specimens of the slender *Thelymitra Elizabethae* (one of some six Victorian orchids described by Dr. R. S. Rogers in a recent paper read before the Royal Society of S.A.). There were two appendages, one very long and the other short, in front of the column (or in the part shaped like the letter U). These were considered by Dr. Rogers to be of great interest, as representing in a sterile form, the third stamen (A3) of the inner whorl. This stamen usually is amalgamated with the labellum, to form central ridges and rarely survives as a definite staminode.
—A.J.T.

AUSTRALIAN ANTHROPOLOGY.

The Anthropological Society of South Australia was formed in July, 1926, with the object of promoting the study of anthropology, with special reference to the Australian aboriginal. Dr. R. H. Puleine was appointed Chairman, Prof. F. Wood Jones, Dr. T. D. Campbell, and Mr. C. P. Mountford form the Committee, and Mr. N. B. Tindale, South Australian Museum, is the Honorary Secretary.

Meetings are held monthly, and much original data on the following subjects, has been brought forward by members:—Message sticks, smoke signals, birth, burials, magic, petroglyphs and rock paintings. The information will, it is hoped, be published in the near future. Men outback, who have accepted Honorary Corresponding Membership, supply much information that is new in response to the *questionnaires* regularly sent out. Interest is being aroused and the original membership of 14 has nearly doubled. A complete card catalogue of works on Australian aborigines is being compiled, under the direction of Dr. Campbell, and different members are compiling records of native camp-sites, burial grounds, occurrences of petroglyphs, the distribution of tribes, etc.

Members of the Society recently visited Eden Valley (50 miles from Adelaide) and examined recently-discovered rock shelters and camp-sites; some fine implements were found. As a further result of the interest in anthropology awakened by the Society's activities, many fresh specimens of native handiwork are being donated to the national collection.

EXCURSION TO TOORADIN.

A small party journeyed to Tooradin on November 6, and spent a pleasant and profitable day. The weather was ideal for the seaside. Along the road from the railway station, flanked on both sides by grazing paddocks, and at times running parallel with a main drainage channel, introduced plants were the feature of the vegetation, among them being a few plants of the Ox-eye Daisy, *Chrysanthemum leucanthemum*. Swamp Paper-bark, *Melaleuca ericifolia*, lined the road in some parts, and here and there a Black Wattle, *Acacia mollissima*, was seen in bloom. Some fine specimens of these trees, in full bloom and fragrance, were seen later, in the township. A detour to the west was made, to examine a sandy hill covered with Manna Gum and Bracken, but few flowers rewarded the walk. A few scrappy blooms of Wedding Bush, Common Parrot Pea, and Aotus, with one orchid, *Microtis porrifolia*, were the only finds, but our bird leader demonstrated here the method of bringing up the parents, White-eared Honey-eaters in this case, by imitating the weak, chirping of young birds.

We entered the township from the west, and examined the vegetation on the banks of the creek, up which the flood-tide waters of Westernport were rushing. Species found in bloom on the banks of the creek were Swampweed, *Selliera radicans*, and Creeping Brookweed, *Samolus repens*, while Yellow Sea-lavender, *Statice australis*, was noted in early-bud stage.

The main feature of the shore vegetation at the mouth of the creek is White Mangrove, *Avicennia officinalis*, densely covering a large area of tidal mud flats. No flowers, but some buds, and half-ripe fruits were found. Tooradin is the nearest place to the city where these curious plants may be studied. During a walk of two or three miles along the shore, many unfamiliar plants were met with, the rarest being Salt Plagianth, *Plagianthus spicatus*, which grew sparingly on the partially inundated sea-marsh land on which Samphire, *Arthrocnemum arbusculum*, Beaded Glasswort, *Salicornia australis*, Marsh Saltbush, *Atriplex paludosum*, Sea-berry Saltbush, *Rhagodia baccata*, and Trailing Jointweed, *Hemichroa pentandra*, were thickly interspersed.

On the drier parts the needle-pointed leaves of the Coast Spear-grass, *Stipa teretifolia* (in fruit), were a menace to unprotected legs.

The most attractive feature of the saline-flats was the wealth of colour displayed by the Rounded Pig-face, *Mesembrianthemum australe*. The plant grew in large patches, often quite round, and the fleshy foliage varied from blood-red through pink and yellow to bright green, which, with the pink rays of the large flowers, made a gorgeous display. This was relieved by the occasional bright yellow patches of Water-Buttons, *Cotula coronopifolia*. In many of the patches of the Pig-face was a central mass of dead runners and leaves; outside this a zone of dead fruits with ripe seeds, then bands of colour, green, yellow, and red foliage, with the flowers on the last zone. They reminded one of Fairy Rings of fungi, and the same explanation, no doubt, would apply.

Other plants gathered on this area were *Sebaea albidiflora*, *Leptocarpus tenax*, *Hydrocotyle capillaris*, *Lobelia platycalyx*, *Apium prostratum*, and *Distichlis spicata*. Adjoining this saline marsh-land was a belt of Swamp Paper-bark, with very

little grass or herb plants; and inland from this a sandy belt covered with Manna Gum, where Slender Stackhousia, *S. viminea*, Twiggy Aster, Rough Fireweed and Variable Groundsel were blooming. Two specimens of Tiger Orchid, *Diuris sulphurea*, were gathered here.

Report on birds by Miss J. Galbraith:—Although we spent little time watching birds, several interesting species were noted. The thickets of Tea-tree provided perfect nesting sites for White-eared Honey-eaters, and we found these graceful birds in all parts of the district visited. Often they flew within a few feet of us. We were much interested by the varied notes of these birds, several of which could not have been recognised as those of the same species, had they not already been familiar to us. The Grey Thrush was often heard, and the piping of Pallid Cuckoos sounded about us all the time.

Among the belt of Melaleuca along the shore we heard, again and again, the note of an Eastern Whip-bird, rising sharply above the songs and warblings of Striated Thornbills and Blue Wrens. In the salt-marshes, we watched a small flock of Sharp-tailed Sandpipers, wading in the shallow water. Above them flew several Pelicans, and beyond, where the deeper water was ruffled into waves between the mangroves, Silver Gulls swept up and down. A Grey Fantail was seen in the Melaleuca. Wood Swallows, *Artamus tenuirostris*, flew overhead or darted to chase a Thrush or one of the many allied Flycatchers, whose presence, clearly, was not desired. They did not molest a Black-and-White Fantail, *Rhipidura leucophrys*, seeking insects on the grass, but a pair of Red-wattle birds incurred their fierce anger. A Laughing Kookaburra greeted us as we entered the town; Swallows skimmed through the sunshine, and Noisy Miners mingled their peculiar notes with the music of Black-backed Magpies and Grey Butcher-birds. Of introduced birds, Goldfinches, Sparrows and Starlings were common, especially the last-named. One English Skylark also was seen just before it disappeared in the sky.—H. B. WILLIAMSON.

CUP DAY EXCURSION TO HURSTBRIDGE.

Ideal weather conditions marked the excursion to Hurstbridge on Cup day, November 2. Panoramic views from the crest of the hills were a delight, after the easy walking. Unfortunately, the electric power failed on our return railway journey, and with an hour spent on the platform at Hurstbridge, and another for the journey between Hurstbridge and Eltham, much time was spent in travelling. But we had other compensations; 157 botanical specimens were collected and named. Mr. V. Miller's time was fully occupied in identifying the calls of birds. Mrs. Geof. Healey collected "old" bird-nests for exhibition at the Club meeting.

Mr. W. H. A. Rogers supplies the following entomological notes:—Two species of butterflies were noted—the *Painted Lady*, *Pyrameis Kershawi*, and one of the Skippers. Several specimens of a little metallic green day-flying moth, *Procris viridipulverulenta*, were taken, and small grass-moths were plentiful. The larvae of two species of case-moths were found on dogwood (*Cassynia*), and a number of small beetles of different species were beaten out of Eucalyptus saplings and other shrubs. The locality seems a favourable one for entomologists.—A. J. TADGELL.

NEW ZEALAND FORAMINIFERA.

The Geological Survey of New Zealand has just published a monograph, by our fellow club-member, Mr. F. Chapman, A.L.S., on the Cretaceous and Tertiary Foraminifera and Ostracoda of the Dominion. A work of this nature satisfies a long-felt want, as, except for the papers published in 1864, by the Austrian scientists, Doctors Karrer and Stache, on the collections of the "Novara" Expedition, the Microzoa of New Zealand have been almost untouched.

Mr. Chapman has been enabled to make a comprehensive study of the subject, and he records the occurrence of 277 species and varieties of Foraminifera, 11 of which are new to science, and 28 species of Ostracoda, five of these being new. Although the New Zealand Tertiaries are rich in Foraminifera, they are excelled in this respect by our Victorian deposits. The monograph is illustrated by 22 plates, which give figures of all the species recorded. These include reproductions of Stache's and Karrer's plates, the nomenclature of these authors being revised. A very complete index is also provided.

Several species hitherto known from Australian fossil deposits only, are now recorded from New Zealand. Although our Janjukian polyzoal limestones are well represented by their equivalent, the Oamaru series, no fauna comparable with that of the Batesford limestone is disclosed, the only species of *Lepidocyclina* found, *L. dilatata*, belonging to an older horizon than those occurring at Batesford. A noteworthy record is that of *Miogypsina irregularis* (Mich.), a species characteristic of the middle Miocene of France and Italy, and not yet found in Australia, although it has been recorded from the New Hebrides by Mr. Chapman.

Mr. Chapman's researches have thrown fresh light on the relationship of the strata making up the so-called Cretaceous-Tertiary series of Hector and other New Zealand geologists. He regards the Amuri limestone as belonging to the youngest Cretaceous beds, while the Weka Pass stone, which has so far been unproductive of any of the larger fossils, which would aid in its satisfactory placing in the time scale, has provided a microscopic fauna of Tertiary aspect, which Mr. Chapman considers to be of Upper Eocene age.

The importance of the Foraminifera has not yet been realised in Australia, so it is pleasing to note that the Director of the New Zealand Geological Survey calls attention to the use made of them in correlative work in the Californian, Texas, and other Tertiary oilfields.—W.J.P.

"The Cretaceous and Tertiary Foraminifera of New Zealand," by F. Chapman, A.L.S.—Pal. Bull. No. 11, N.Z. Dept. Mines, Geol. Survey Branch, Wellington, 1926.

INSECTS OF AUSTRALIA AND NEW ZEALAND.

The publication of Dr. R. J. Tillyard's work, "The Insects of Australia and New Zealand," is a notable event for naturalists. The book is not only an important contribution to the science of entomology; it also sets a new standard for handbooks of the kind, ranking at once as a classic. For many years it must remain *the* work for all students of the insect faunas of Australasia. Indeed, it should be used by entomologists generally. Dr. Tillyard is recognised as one of the world's leading entomologists; his earlier book, "The Biology of Dragonflies," was a brilliant "introduction," as it were, to the present volume, in connection with which he has, necessarily since the field is so extensive, received assistance from numerous other workers, including several members of our Club.

Dr. Tillyard gives the essential facts regarding insects; a general outline of their classification and morphology, and more detailed accounts of the different Orders, keys to the Sub-orders, Super Families and Families, and accounts of all the Families in each Order. Sections deal with Life History, Distribution, Fossil History, Economics, etc., and large numbers of species are briefly described. No phase of the subject has been overlooked. The work, far from being a compilation, is marked throughout by originality. The author is a literary craftsman, as well as a great entomologist, and, in summarising facts to fit a page or two when they might furnish matter for a chapter, he does not make the text arid, but retains the style that makes for pleasant reading. Yet all he has written bears the clear sign of a highly-trained scientific mind. In brief, his book is a masterpiece.

The illustrations are from new drawings, mostly by the author himself, or from photographs made specially for the volume. There are eight plates in colour, a number of halftone plates, and text figures, delightful in their accuracy and detail. It is a pleasure to look through this gallery of insect portraits; while the student will find the illustrations a liberal education in general entomology.

The publishers (Messrs. Angus and Robertson Ltd., Sydney) may be congratulated, as well as the author;

they have produced a book worthy of its own high scientific excellence. Printing, paper, binding, and plates, all are in keeping. It is good to know that natural history works, equal in every way to the best that are published overseas, can be "made in Australia."

Though intended primarily as a text book, "The Insects of Australia and New Zealand" will be of great value to others than students; it appeals to the amateur entomologist, and the nature lover also, and, since the economic aspect of insect life is dealt with, to the orchardist, the pastoralist, and the farmer. The scientific entomologist will gain much from every chapter; the amateur, who reads the book with close attention, and refers to it frequently, will in time have a general knowledge of insect life, and be able to recognise a large number of species, the most of those he meets with on his natural history rambles.

No amateur Australian or New Zealand field naturalist, whose special interest is in entomology, need hesitate now to begin the study of one of the Orders, as represented in his own country. Dr. Tillyard has made the way easy for us all; given us a guide in this handsome volume, which, though rich in perhaps unfamiliar terms, and written with meticulous care for scientific accuracy, is not beyond the layman's understanding. Clear and concise definitions of the scientific and technical terms used, are given in an appendix, a valuable glossary.

Orders that too often receive scant notice in general works on entomology, in this volume are given due attention. Dr. Tillyard's extensive knowledge of Mayflies, Stoneflies and Dragonflies, has enabled him to reveal these insects to us, to write biographies of many species, and give fresh details concerning development and structure.—C.B.

PIED GEESE IN VICTORIA.

Formerly the Pied Goose, *Anseranas semipalmata*, or Magpie-Goose, as it is commonly termed, was abundant in Victoria, with headquarters among the Murray billabongs and lagoons. Its numbers steadily decreased, owing to the advance of settlement and indiscriminate shooting, until a common species became scarce in our State, and also in the Riverina. The drought of 1914-15 completed the decline: the Pied Goose disappeared from Victoria. There was no further record of it for this State, until November last, when it appeared again. I quote from a letter received from Mrs. A. D. Selby, who lives in a favorable locality for bird observing, in the Western District:—

"Water fowl are very numerous around here this year—there are many swamps filled from the channels, and the back country is drying up rapidly. I was very pleased to see a flock of Pied (magpie) Geese last week, not very shy."

These birds deserve the most rigid protection; but no game bird, however rare, is quite safe from the pot-hunter.—C.B.

Field Naturalists' Club of Victoria

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V. Miller.

EXCURSIONS.

SATURDAY, DECEMBER 11.—Yan Yean. Object: General.
Leader: Mr. A. E. Rodda. Meet at Spencer Street Station, in
time for 8.50 a.m. train. Lunch to be taken.

SATURDAY, DECEMBER 11.—Selby. The Combined Progress
Associations of the Shire of Fern Tree Gully invite members
to their meeting to be held at Selby, at 3 p.m. for the purpose
of discussing the question of the Forestry Department's re-
fusal to favour the proposal that Dandenong State Forest
should be proclaimed a National Park.

XMAS EXCURSION.—DECEMBER 27th to JANUARY 3rd.—
Mitchell Gorge, via Fernbank. Object: General. Leader: Mr.
C. Daley, B.A., F.L.S. There are two or three vacancies. If
complement is secured, the party will travel both ways by motor
vehicle. Application must be made at once. Members going
should forward £1 each to the Leader towards purchase of food
supplies. Final instructions will be posted to each member
of the party.

SATURDAY, JANUARY 15.—Botanic Gardens. Object: Aquatic
Zoology. Leader: Mr. J. Searle. Meet at office gate at
2.30 p.m.

SATURDAY to MONDAY, JANUARY 29-31.—Warburton. Ob-
ject: General. Leader: Mr. A. E. Rodda. Meet at Flinders
Street Station for 1.38 p.m. train. Members intending to take
part are requested to hand names to the Leader at the De-
cember meeting. Further particulars to be announced later.

EASTER EXCURSION, APRIL 15th to 19th.—Toolangi.
Object: General. Leader: Mr. A. E. Keep. As accommoda-
tion is limited, Members wishing to join this excursion are
requested to hand their names, together with £1 deposit, to
the Leader at December meeting.

NOTE.—The January meeting will be held on the *third* Monday,
January 17th.

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JANUARY, 1927.



The Victorian Naturalist:

THE JOURNAL AND MAGAZINE

-- OF

The Field Naturalists' Club of Victoria

Published 10th January, 1927

Hon. Editor: CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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1927

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 17th JANUARY, 1927.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS	PROPOSER:	SECONDER:
Mr. J. Halliwell, 23 Grace Street, Moonee Ponds.	Mr. M. J. Wood- house	Mr. E. E. Pescott, F.L.S.
Mr. L. Byrne, "Inglesby," Albert Crescent, Surrey Hills.	Mr. A. E. Keep	Mr. L. L. Hodgson
Mr. C. Deane, 9 State Street, Malvern.	Mr. C. French, Snr.	Mr. D. Best

AS COUNTRY MEMBERS:

Mr. Robt. A. Kent, Narre Warren.	Mr. E. R. Hammett	Mr. P. R. H. St. John
Mr. Alex. D. Selby, C/o Mr. W. Chequer, Quantong.	Mr. C. Barrett	Mr. L. L. Hodgson

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural specimens, should exhibit them at the Club's meetings, and, if possible, make a few remarks concerning them; also to furnish the Hon. Secretary with written particulars for record in the Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

6. A Night with the Stone-age Man. Lecturettes by Club members and leading anthropologists.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a short account thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

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No. 517.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, December 13th, 1926. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 140 members and visitors were present.

The President extended a hearty welcome to Mr. F. G. A. Barnard, who responded in appreciative terms.

LATE MR. FRANK WISEWOULD.

The President referred to the death of Mr. Frank Wisewould, one of the original members of the Club, and the following vote of sympathy with his relatives was carried in silence, members standing:—

The Field Naturalists' Club of Victoria records with great regret the passing away of one of its original members, Mr. Frank Wisewould. Mr. Wisewould filled, with dignity and honour, high offices in the Club. He was a courtly and happy gentleman; he loved the beautiful in nature, and his passing hence leaves a blank that will never be filled. The Club extends its deepest sympathy to his sorrowing relatives.

CORRESPONDENCE.

From Secretary, Children's Hospital, thanking the Club for donation of £25, and suggesting that a member be nominated as a Life Governor.

From Combined Progress Associations of Shire of Fern Tree Gully, stating that the Forests Department had refused to accede to the request that Dandenong State Forest be proclaimed a National Park, and asking that the Club take further action in the matter.

REPORTS.

Reports of excursions were given as follow:—Sydenham and Bulla, Mr. A. L. Scott; Healesville, Mrs. E. Coleman; Millgrove, Miss M. R. Wigan; and Yan Yean, Mr. A. E. Rodda.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Mr. H. L. Torpy, Alma Road, St. Kilda; Dr. Cecil F. Tucker, Alma Road, St. Kilda; Mr. H. A. Knight, 50 College Street, Elsternwick. As Country Members:—Mr. Basil B. P. Waller, Glenalladale, via Fernbank; Mr. Jas. Yeates, Bairnsdale; Mr. Marc. Cohen, 29 Hope Street, Bendigo; Miss E. Lyle, Inverleigh. As Associate Members:—Master Geoffrey Byrne, 27 Albert Crescent,

Surrey Hills; Master Albert Smith, 10 Lord Street, Carnegie.

GENERAL.

The President stated that arrangements were being made for a deputation, under the leadership of Sir Frank Clarke, M.L.C., to approach the Ministry early in the new year in regard to Dandenong State Forest being proclaimed a National Park, under the control of Trustees.

On the motion of M. G. Coghill, seconded by Mr. F. G. A. Barnard, Mrs. V. Miller was nominated as a Life Governor of the Children's Hospital.

The President drew attention to a press notice regarding Mr. F. Chapman's work as a Palæontologist, and spoke highly of Mr. Chapman's achievements.

In the absence of the Hon. Treasurer, the Hon. Secretary read the financial statement of the Flower Show, which showed an approximate profit of £124. The statement was received and adopted on the motion of Messrs. G. Coghill and E. R. Hammet.

LECTURETTES.

The President introduced the subject of the evening—"Birds—With Special Reference to the Kookaburra." The Hon. Secretary read a letter from Professor W. A. Osborne, who thanked the Club for its invitation to attend the meeting, but regretted that he was unable to be present.

Mr. C. French, Jr., exhibited a fine mounted specimen of the Kookaburra, and a well-executed coloured drawing of the bird was shown by Master Guthrie.

Mr. A. Mattingley, C.M.Z.S., spoke in favour of the Kookaburra, and made a plea for predatory birds in general, quoting the opinion of British observers, who do not even condemn Cormorants.

Rev. Mr. C. Lang also spoke in favour of Kookaburras, and protested against the condemnation of the species generally, on account of the misdeeds of a few individuals. Mr. Lang exhibited a series of lantern slides of the Kookaburra and Lyre-bird.

Mr. Tom Tregellas spoke strongly in favour of the Kookaburra, stating that the Butcher-bird was a much more destructive species. A fine series of lantern slides, depicting Kookaburras and Lyre-birds, was shown by Mr. Tregellas in illustration of his remarks.



The Kookaburra.

Photo. C. Barrett.

Mr. H. B. Williamson showed a lantern slide of a Lyre-bird in nest, taken in the Buffalo Gorge, 39 years ago; also two slides of a Podargus, taken 25 years ago.

Mr. C. Barrett made a strong protest against the condemnation of the Kookaburra, and showed a fine series of lantern slides of this and other birds, taken by Messrs. R. T. Littlejohns, D. Dickison and himself.

Mr. C. French, Jnr., voiced a fear that the denunciation of the Kookaburra, in a newspaper article, might encourage farmers and others to destroy a very useful bird.

Mr. F. E. Wilson supported the views of the previous speakers.

Mr. P. R. H. St. John stated that the Kookaburra's misdeeds in the Botanic Gardens, were many. Every species of bird frequenting the Gardens, excepting the Sparrow, had suffered from its ravages; nevertheless, he did not favour its destruction.

Mr. C. Barrett moved—

That the Fisheries and Game Department be requested not to accede to any representations which might be made for the removal of the Kookaburra from the list of protected birds.

Mr. V. Miller seconded the motion, which was carried unanimously.

EXHIBITS.

By Mr. E. E. Pescott: Christmas bush, *Prostanthera lasianthos* Labill.

By Mr. D. J. Paton: Orchids collected at Boronia—*Prasophyllum odoratum*, Rogers; *P. australe*, R.Br.; *Orthoceras strictum*, R.Br.; *Cryptostylis longifolia*, R.Br.; *Pterostylis decurva*, Rogers.

By Miss J. W. Raff: Complete nymph of the Green Cicada, taken from its burrow in the Fitzroy Gardens, December, 1926.

By Mr. W. H. A. Rogers: Larva of *Nataxa flavescens*, with specimens of the moth, showing the marked difference in the sexes; "Moonlight Blue" butterfly, *Miletus delicia delos*, female, bred from a larva that was kept for six months, without being attended by ants.

By A. J. Tadgell: Growing specimen of "Fishbone Fern," *Blechnum* or *Lomaria discolor*; bipinnate variety, from near Mt. Dandenong. Although the type form is one of the commonest met with, in wet gullies or along watercourses, the exhibitor, a student of Victorian ferns

for 30 years, has found only six specimens of the bipinnate form, but odd fronds show divisions of the pinnae. The bipinnate form has been collected in the Dandenongs, the Grampians, and the mountains behind Riddell's Creek. Thousands of growing ferns have been examined, resulting in a few finds only. Some years ago bipinnates were on sale in a seedsman's shop, in Swanston Street. At the Botanical Gardens, Melbourne, a number, true to the bipinnate form, was raised from seed. Three forms of the very variable "Weeping Fern," *Asplenium flaccidum*, from Warburton and Healesville. The differences are striking. No. 1 is very flaccid and covered with seed spores, much like the "Mother Fern," *A. bulbiferum*. No. 2 is thick and lined, with fewer seeds showing (seed-cases dispersed). No. 3 is thick, and, unlike No. 2, more open in the segments, with few seeds (sori) showing. Generally, this fern hangs gracefully from tree-ferns.

By Miss E. Hart: Flowering specimens of New Zealand Christmas Bush, *Metrosideros tomentosa*.

By Mrs. A. H. E. Mattingley: Young Wombat, about two months old. The mother was run over and killed by a motor car on December 3, and the young one was taken from her pouch. As the young remain in the pouch for at least three months, they are very difficult to rear in captivity. This specimen was in a state of collapse for four days, but by the aid of hot bottles and frequent doses of brandy it survived.

FRESH-WATER SPONGES.

Dr. N. Gist Gee, Assistant Resident Director, China Medical Board of the Rockefeller Foundation, Peking, China, wishes to obtain specimens of fresh-water sponges from Australia. He offers to send sponges from China in exchange for any Australian specimens that may be sent to him. The study of fresh-water sponges is a "personal hobby" of his, and he would be pleased to try to identify unnamed specimens, if they have any gemmules.

"The simplest method of preparing them (sponges)," writes Dr. Gee, in a letter to the President of our Club, "is to allow them to thoroughly dry out in the shade, and then wrap each specimen in a separate piece of soft paper (do not use cotton) and mail them in a light wooden or tin box. I would be glad to have them carefully removed from the surface of stone or wood upon which they may often be found growing, in order to show the whole sponge formation and to get the gemmules which often form a layer at the base of the sponge. Of course, if they are on grasses or small twigs, etc, collect them with these things upon which they grow."

GRASSES OF THE MELBOURNE DISTRICT.

BY P. F. MORRIS, NATIONAL HERBARIUM.

The purpose of this paper is to give those with little or no knowledge of grasses, such an understanding of the structure, together with the figures and keys, as will enable them to obtain some idea of our native grasses. I trust that the grasses may become better known, and their economic worth and beauty more appreciated.

Grasses are herbs with round or flattened (Fig. A.4), usually hollow stems or culms (never three-sided), solid at the joints or nodes (A.5), and two ranked, alternate, parallel-veined leaves, composed of two parts, the sheath and blade (Fig. A.6). At the junction of the sheath and blade, on the inside, is a small membrane, known as the ligule (A.2); this may take the form of a ring of hairs, or, sometimes, a transparent appendage of varying shape.

The spikelet, or inflorescence, consists of glumes and florets. The flowers generally are small, bi-sexual, naked, in the axil of a concave bract called the flowering glume (Fig. V.). A palea (B) envelops the flower, which consists of a one-celled, one ovuled ovary, two feathery stigmas (B), two and three stamens, with versatile anthers (B.1). Thus grasses have no proper floral envelope, or perianth. The spikelet is the unit of the inflorescence (V), and the floret is the unit of the spikelet (V.). The floret is never more than one-flowered, with one lemma and one palea (Fig. B.). The glumes and florets are always alternate (two consecutive ones never being borne above one another).

Many members of the Cyperaceae resemble the family Gramineae, but differ in having solid stems, without nodes, leaf-sheath not split, and having the flower supported by a single bract. The stems are often three-sided (A.3), whilst grass stems are never three-sided (Fig. 4).

GRAMINEAE.

Imperata cylindrica, Beauv. "Blady Grass." Fig C.

This cosmopolitan native grass has a large, silky-white head. The spikelets are in pairs, one being sessile, the other pedicillate. It has thick perennial rootstock, and is useful for binding sand and river banks.

Rottboellia compressa, L. "Mat-Grass." (*Hemarthria compressa*). Fig. W.

A decumbent, or creeping grass, sometimes rigid and ascending to two feet in height. Found on the margins of lakes, ditches, salt-marshes. Spikelets in pairs, one sessile, the other pedicellate; glabrous. Differs from *Lep-
turus cylindricus* (Fig. O.), which it resembles in having the spikelets solitary, terminal compressed, while *L. cylindricus* has the spikelets solitary and alternate, the nerves of the outer glume more prominent, the stem more cylindrical.

Themeda triandra, Forst. "Kangaroo-Grass." (From "Themed," the Arabic name.)

Perhaps the best known of our native grasses. It is much appreciated by stock; so much so, that in old pastures, it has become extinct. The plant produces little fertile seed. See Fig. U.

Zoysia pungens, Willd. "Prickly Couch-Grass." (*Osterdamia*.)

A perennial low grass, with creeping rhizomes, short, pungently pointed blades, and terminal spike-like racemes, the spikelets on short appressed pedicels. Spikelets one-flowered, laterally compressed, appressed flatwise.

Paspalum distichum, L. "Silt-Grass." Fig. E.

A grass with creeping stolons, and racemes in pairs at the summit of the culms. Grows in moist places. See Fig. E.

PANICUM.

Spikelets more or less compressed dorsiventrally, arranged in open or compact panicles. Spikelets with back of fruit placed towards the rhachis.

P. crus-galli, L. "Barnyard-Grass." (Fig. F.2.)

A cosmopolitan native grass of annual habit. Spikelets closely attached to the branches of the panicle, in two or four rows on one side of the stem. Spikelet sometimes turns from green to purple.

P. decompositum, R.Br. "Umbrella-Grass."

A quick-growing summer grass, with long divided panicle branches, somewhat like Fig. M. in habit, but spikelet like Fig. F.1, with the lowest glume truncate, barely one-third the length of the spikelet, three-nerved.

P. prolutum, F. v. M. "Pallied Panic Grass."

A rigid, glabrous perennial, somewhat like Fig. 4, but the spikelet as in Fig. 1, with the lowest glume half as long as spikelet. Grows in damp places.

P. sanguinale, L. "Summer-Grass."

A cosmopolitan native grass, with panicle branches simple, spike-like—somewhat resembling a hand. Plentiful in gardens during the summer months, and is often known to gardeners as Yan Yean Grass, as it appears about the time when gardens need watering. Fig. F. and F.1.

Oplismenus compositus, Beauv. "Creeping Beard-Grass." Glumes four, outer glume with a long awn. Closely allied to *Panicum*.

A weak grass, very hairy, stems creeping, sometimes ascending to 1 ft. high.

SETARIA (Fig. H.).

(Latin, seta, a bristle.)

S. glauca, L. "Pale Pigeon-Grass." Spikes rather short and dense, flowering glume strongly rugose or marked. See Fig. H.1.

S. viridis, Beauv. "Green Pigeon-Grass," Similar to above, but with a smooth flowering glume.

S. macrostachya, H.B. and K. "Bearded Pigeon-Grass." Spikes longer than in the two above species, seemingly whorled, teeth of bristles erect. Fig. H.1 (part).

S. verticillata, Beauv. "Whorled Pigeon-Grass." Similar to above, but with whorled teeth on bristles, subtending the spikelet.

Spinifex hirsutus, Lab. "Hairy Spinifex."

Leaves long and silvery. Flower heads, male and female on separate plants. The male head spike-like, the female or fertile head semi-globular, 3 inches or more across, somewhat like a giant "Kangaroo-Grass." Fig. U., but very silky.

A large, hairy grass, with perennial creeping stem. In sand along the coast.

Microlaena stipoides, R.Br. "Weeping-Grass." (Mikros, Greek, small; alina, a cloak), in reference to the two small outer glumes.)

A perennial grass with weeping habit, 1 to 2 feet in height. Spikelet one-flowered, first and second glumes minute, unequal, persistent. Fig. T.

TETRARRHENA.

T. juncea, R.Br. "Wire-Grass."

A scrambling grass that climbs over bushes to a height of 8 feet to 12 feet. Common in Dandenong Ranges, etc.

Glumes, 6; third glume nearly as long as fourth and fifth; outer glumes obtuse, unequal.

T. distichophylla, R.Br. "Hairy Rice-Grass."

Stems arising from a creeping base to 1 ft.; rigid but slender.

T. acuminata. "Pointed Rice-Grass." Stems long and slender. Leaves long and broader than "Hairy Rice-Grass." Spike 1 to 1½ inches long. Large glumes acutely acuminate.

STIPA, L. Fig. J.

(From Greek, stype, tow, alluding to the fibre.)

S. flavescent, Labill. "Pale Spear-Grass." Ligule ciliate, outer glumes straw coloured, acute under ½ inch long, 1½ to 3 feet high glabrous, the lower leaves slightly hairy. Awn 2 inches long.

S. Muelleri, Tate. "Wiry Spear-Grass."

Spikelets in a short racemes, ligule long, glabrous. Leaves few, almost absent. Awn minutely pubescent, 2 to 2½ inches long.

S. pubescens, R.Br. "Tall Spear-Grass."

A variable grass, with either glabrous (var. *semi-glabra*, Reader.) or pubescent leaves. Grows to a height of 3 feet or more, but varies. Panicle loose, outer glumes of spikelet green and purplish; awn 1½ to 2 inches long, slender, with two bends.

S. setacea, R.Br. "Corkscrew-Grass." Flowering glume silky-hairy, nodes minutely pubescent, awn slender, 2 inches long, twisted. Sheath bearded.

S. semibarbata, R.Br. "Fibrous Spear-Grass," Awn stout, hairy, half way up.

S. scabra, Lindl. "Rough Spear-Grass." 1 to 2 feet high, leaves short, panicle loose, 6 inches to 1 foot long, with long spreading glabrous branches. Distinguished from the former by short fine ligule. from pubescens by the more slender habit.

S. teretifolia, Steud. "Coast Spear-Grass."

Alopecurus geniculatus, L. "Marsh Foxtail." (Alopex, a fox, oura, a tail, Greek.)

A cosmopolitan native grass, which grows in wet ground. Fig. I.

SPOROBOLUS, R.Br.

(Sporos, a seed, bolos, throwing.)

S. indicus, R.Br. "Rat-Tail-Grass."

A tussocky fibrous grass, 1½ to 2½ feet. Fig. L.

S. virginicus, Kunth. "Coast Rat-Tail-Grass." Spike-

let one-flowered, as in former, but differs in having the second glume shorter than flowering glume. Panicle spike-like, lead-coloured, $\frac{3}{4}$ to $2\frac{1}{2}$ inches long.

AGROSTIS, L.

A. scabra, Willd. "Rough Bent-Grass." Panicle spreading, spikelet-like, Fig. M.1, but with no awn. 6 inches to 1 foot high. Outer glume rather acute.

A. venusta, Trin. "Graceful Bent-Grass." Outer glume very acute, one line long—the former is $\frac{3}{4}$ line long, with larger leaves.

CALAMAGROSTIS.

Differs from *Agrostis* in the presence of a conspicuous tuft of hairs at the base of the flowering glume, together with a bristle arising from the back of the palea. (Fig. M.1.)

C. filiformis, Pilger. "Blown Grass." Fig. M. and M.1. Panicle loose.

A tumble-grass, which is blown or rolled along by the wind.

C. quadriseta, Spr. "Reed Bent-Grass." Panicle not loose, but spike-like; awn almost basal.

C. minor, J.M.B. "Smaller Bent-Grass." Bristle absent.

DICHELACHNE.

D. crinita, Hk.f. "Long-Hair Plume-Grass," and *D. sciurea*, Hk.f. "Short-Hair Plume-Grass." Perennial grasses resembling *Stipa* in habit. In *Stipa* the awn is terminal, in *Dichelachne* the awn is dorsal near the summit of the glume. *D. sciurea* differs from *D. crinita* in having a shorter and less conspicuous awn.

Amphibromus nervosus, Hk.f. "Swamp Wallaby-Grass." See Fig. G.

DANTHONIA.

(Danthoine, French botanist.)

Spikelets, several flowered, with a hairy callus at base. Outer glumes, two. Very variable perennial grasses.

D. penicillata, F. v. M. "Wallaby-Grass." 5 inches to 4 feet high, awn or flower much longer than lobes, Fig. K.1.

Numerous varieties. Needs revision.

D. carphoides, F. v. M. "Short Bandicoot-Grass."

A short grass, differing from the former in size, and having the lobes and awn of equal length, or nearly so.

Phragmites communis, Trin. "Common Reed."

A large bamboo-like grass that grows along creeks,

swamps, etc. 5 to 6 feet; leaves 1 inch broad. The large inflorescence silvery.

Diplachne loliiformis, F. v. M. "Rye Beetle-Grass." Fig. N.

Eragrostis Brownii. "Common Love-Grass." D.1.

Spikelets several-flowered, lead coloured, glumes nerved, panicle loose or spreading, leaves narrow, bearded behind the ligule. Fig. D. is a composite of the genus.

Distichlis spicata, Greene. "Salt-Grass." Seaside. Fig. 1.

Poa caespitosa, Forst. "Tussock-Grass." Fig. S.

A tall, variable perennial grass, growing in tussocks. Spikelet Fig. S., and habit of inflorescence S.1.

GLYCERIA.

Differs from *Poa* in having flowering glumes round on back, the lateral nerves straight and not converging on the central nerve, and branched stigma hairs.

G. dives. "Giant Mountain-Grass." A stout, erect glabrous grass, attaining a height of 5 to 12 feet. Leaves flat and long. Panicle loose and spreading, 6 inches to 1 foot long.

Wet, shaded gullies of Victoria.

FESTUCA. Fig. V. and V.1.

Spikelets several-flowered, paniculate, glumes generally acute or tapering into an awn.

F. duriuscula, L. "Hard or Sheep's-Fescue."

A perennial, with short thin leaves, mostly basal, much shorter than stems. Flowering glume faintly five-nerved, tapering to an awn about half its length.

F. littoralis, Labill. "Coast-Fescue."

A perennial with rigid leaves as long as stems, leaves cylindrical, as also has the former. See Fig. V.

LEPTURUS. (Fig. O.)

(Leptos, slender, oura, tail, Greek.)

L. incurvatus, Trin. "Coast Barb-Grass." Spikes cylindrical, curved, outer glumes two. Fig. O.1.

L. cylindricus, Trin. "Common Barb-Grass." Similar to above, but spikes thicker and usually straight, and has but one outer glume. Fig. O. and O.2.

Agropyrum scabrum, L. "Common Wheat-Grass." (Agros, a field, pyros, wheat.)

A very variable perennial plant, 1 to 4 feet high, leaves scabrous on the edges. Spikelets distant 6 to 12 flowered, flowering glumes narrow, rigid. See Fig. R.

STRAY NOTES ON STONE-FLIES.

BY CHARLES BARRETT.

Until Dr. R. J. Tillyard began to study the Order Perlaria, little was known regarding our stone-flies. We were ignorant of the fact that the most remarkable, perhaps, of all the described species, existed in Victoria, though a specimen, taken at Warburton many years ago, was in the National Museum collection. My interest in these aquatic insects dates from the time when I found several examples of *Eustheniopsis venosa*, crawling over a muddy road, at Monbulk. I sent them to Dr. Tillyard, who told me about the wonderful *Thaumatoperla robusta*, Till, which was known only by one female specimen.

A search along the Yarra at Warburton, the type locality, was unsuccessful; but later, on the Dee River, Millgrove, Mr. F. E. Wilson and Mr. Tom Tregellas obtained three specimens of the female. The male was discovered almost by chance, though I had been searching for it keenly on that stormy day. As Mr. Tregellas and I came down the steep timber-haulage track, in driving rain, we nearly stepped upon a stone-fly, resting in the mud. I collected it, quite unaware that I had a prize, the male of *Thaumatoperla*! It was duly sent to Dr. Tillyard, who figured and described it. No other specimen has yet been obtained; but Mr. Wilson discovered larvae of the species crawling on bits of rotting wood in the Dee.

T. robusta, apparently, is a rare insect; since we have visited Millgrove many times, looking for it always, and the net result is, one male and three female specimens.

Thaumatoperla is a large stone-fly, which cannot be mistaken for any other species. The wings are black and very broad; the pronotum is orange colored.

It was in April, 1920, that Dr. Tillyard, when going through the National Museum collections, discovered "a magnificent new stone-fly, quite unlike anything hitherto known." It was loaned to him for study, and he was thus able to show it to many entomologists in England and the United States. It belongs to the family, *Eustheniidae*, within which it was placed by Dr. Tillyard, "as the sole representative of a new genus, *Thaumatoperla*, forming the only known member of a new sub-family, *Thaumatoperlinae*."

All the Millgrove specimens of *T. robusta* were obtained on the tram track, at about 2,500 feet; the larvae,

also, were found in the stream at that elevation. *Thaumatoperla* is a dweller in high places; and stone-flies generally are to be looked for in the mountains. Our most abundant species, *E. venosa*, I have taken on fern fronds at Belgrave, and on ferns and waterside shrubs and grasses at Sassafras and Monbulk. Nearly a dozen examples were collected in July, on track or road in the Monbulk district. This species has been observed in Spring, and very rarely, in early Summer, while Mr. Wilson took his specimens of *T. robusta* in January and April respectively.

"Generally speaking," Dr. Tillyard informed me, "you may follow this rule, for these insects (stone-flies)—at high altitudes or in cold climates, October to January; moderately warm to warm climates, i.e., up to about Sydney, only July to September; tropics, absent, except at high elevations. Larvae can be got at any time of year, but most full-fed forms occur just before imagines hatch out."

Southern Victoria, Dr. Tillyard states, may be regarded as the headquarters of the family, *Eustheniidae*, for all three sub-families are represented in our ranges. I have taken examples of four species, all along the banks of, or close to, mountain streams. Several specimens of a small and slender stone-fly, with grey, mottled wings, were discovered, resting side by side, under a bit of loose bark on a gum tree.

Stone-flies, as a rule, are sluggish insects; they fly little, and, those species I have observed, in a curious, fluttering manner. But they are capable of fairly swift and high flight: one *E. venosa* which I disturbed, rose slantingly about 40 feet to the branch of a tree. Many I have beaten from herbage along creek or river side; occasionally one has been seen resting upon a stone, in or near the water.

Stone-fly larvae are abundant in our mountain streams; and larval exuviae may be seen attached to plant stems along the banks, to dry stones, bridge piles, etc.; yet the imagines are not familiar objects. A member of our Club asked me recently, "What is a stone-fly?" He had never seen one of these remarkable insects. I am rather confident that further searching will be rewarded; that undescribed species of stone-flies will be found in southern Victoria. Here is another promising field for the young entomologist who desires to garner ungarnered grain, rather than work where already many others have gleaned.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART V.

8. CORYSANTHES, R.Br.

("Helmet Flower.")

Plant dwarf; leaf single, ovate, cordate or oval; flower solitary, dorsal sepal erect, incurved, hood or helmet shaped; lateral sepals and petals small, often diminutive, linear. Labellum large, tubular, base erect enclosing the column. Column short, erect, fleshy, sometimes winged. Pedicel (flower stem) frequently much elongated when fruiting.

I have preferred to retain Brown's name of "*Corysanthès*," instead of Salisbury's prior name, "*Corybas*," following the opinion of British botanists. Schlechter has recently restored Salisbury's name of "*Corybas*," but his example is not being readily followed. It is admitted that Salisbury has claim to priority, but it is well known that he had seen Brown's descriptions or specimens, Bentham remarking that the name "*Corybas*" was "universally rejected as having been surreptitiously figured and described." Salisbury had access to a drawing by Bauer, and so he named and described the original species. British botanists still follow Bentham's lead in refusing to recognise "*Corybas*."

This is an extensive genus, ranging from the Philippines, the Himalayas, through the islands to Papua, Polynesia, New Zealand and Australia. There are five Australian species, of which four occur in Victoria. The single leaf is usually placed flat on the ground, with the flower rarely raised above it, the pedicel being usually very short. The colour is usually purplish; while the large inflated sometimes whitish labellum, and the large helmet shaped dorsal sepal, hooded over the labellum are quite characteristic in all the species.

1. *C. UNGUICULATA*, R.Br. (clawed, referring to the base of the dorsal sepal.) "Small Helmet-orchid."

Plant *very dwarf*; leaf ovate-cordate, sometimes 3 lobed; reddish streaked underneath. Ovary rather long. Dorsal sepal *abruptly contracted into a narrow, linear claw*, claw erect at base, then much incurved. Lateral sepals colorless, narrow linear, petals much shorter,



CYRTOSTYLIS RENIFORMIS, R.Br. LYPERANTHUS NORDLAND, R.Br.
"Gnat-Orchid." "Red-Beak Orchid."



GASTRODIA BESANCONIENSIS, R.Br.
"Potato-Orchid."

CALOCHILUS CAMPESTRIS, R.Br.
"Peaked Beard-Orchid."

spreading. Labellum longer than the dorsal sepal, tubular, inflated in the middle, and diminishing towards the base; margins of the orifice entire; a long row of calli extending from the orifice along the middle of the lamina to the base. Column very short, incurved, two winged.

This diminutive species is not often half an inch in size; being very small, it may have often been passed by. It flowers in July, and is very rare. It is often found growing at the base of *Melaleuca ericifolia*. It is known at Healesville, Fernshawe, Oakleigh and South Gippsland. It is also recorded from New South Wales, South Australia, and Tasmania.

2. *C. FIMBRIATA*, R.Br. (fringed—i.e., the labellum.)
“Fringed Helmet-orchid.”

Plant small; leaf round, cordate, pointed. Flower reddish-purple, almost sessile, ovary terete, rather long. Dorsal sepal erect, and then incurved, gradually contracted to a claw, lamina forming a hood over and beyond the labellum. Lateral sepals colorless, linear; connate at their bases with each other and with the petals. Petals somewhat wider and shorter, colorless, often bidentate. Labellum large, sessile, deep crimson, lower half vertical against the dorsal sepal, enclosing the column in a split tube: upper part acutely recurved, expanded into an orifice with *denticulate margins* and directed forward. Tube at base dilated at each side of attachment into a wide auricle. Column short, not winged.

3. *C. PRUINOSA*, R.Cunn. (“bloom,” i.e., a coating or covering, referring to greyish colour of dorsal sepal.)
“Large Helmet-orchid.”

Flower smaller than Species 2, having a narrower, shorter, or less obtuse hood, not projecting beyond front of labellum. Orifice of labellum *not or scarcely fimbriate*, usually having entire incurved margins.

These two species (2 and 3) are doubtfully distinct. Botanists agree that the principal difference between the two is the absence of fringe or fimbriations on the labellum of *C. pruinosa*. *C. fimbriata* was the first described. The plants are found in colonies, often among tea tree, in fern gullies and other shaded places. Occasionally they will be found growing in abundance on the trunks of tree ferns, notably *Dicksonia antarctica*. They flower in winter and early spring.

Recorded from the South, East and North East; also from all parts of the Commonwealth except the Northern Territory.

It is often difficult to separate the two species, as they frequently grow intermingled.

4. *C. BICALCARATA*, R.Br. (two-spurred; referring to the basal auricles of the labellum.) "Spurred Helmet-orchid."

Plant small, leaf orbicular-cordate, reddish beneath, larger and thinner than species 2, somewhat membranous. Ovary long, cylindrical. Dorsal sepal much incurved, not contracted at base. Lateral sepals and petals very small, *often almost absent*. Labellum small, the tubular base tapering to *two white narrow conical spurs*, between which are the minute lateral sepals: Column wings narrow.

This uncommon species, easily distinguishable by the white spurs and very small sepals, is only known from Healesville, where it flowers in winter and spring. It also occurs in Queensland, New South Wales and Tasmania.

9. *ACIANTHUS*, R.Br.

(Pointed flower.)

Plants dwarf; leaf solitary; one flower stem; several flowers on stem. Dorsal sepal erect or incurved over the column, concave, not very broad, and *often produced to a fine point*; lateral sepals narrow, erect or spreading; petals much shorter. Labellum sessile, as long as the petals, undivided, margin entire; with two basal calli or tubercles. Column semi-terete, not usually winged. Anther broad, erect, two celled with valves.

Terrestrial glabrous herbs, with small underground tubers. Leaf broadly cordate, entire, lobed, or deeply dissected. Flowers usually in a terminal raceme; sometimes solitary, generally several.

There are about 18 species in the genus, mostly occurring in New Caledonia. One comes from New Zealand, and five are recorded from Australia, two of which are Victorian.

These dwarf and almost inconspicuous orchids are usually found in cooler districts, and very often in forest or moor land.

1. *A. CAUDATUS*, R.Br. (tailed, referring to the long dorsal sepal.) "Mayfly-orchid."

Stems slender, glabrous, 3 to 6 inches high. Leaf

radical or nearly so; cordate ovate, quite thin, margins often crenate, sometimes lobed, green above *reddish or purplish below*. Flowers 1 to 4 crimson or purplish crimson, pedicels short. Dorsal sepal dilated over the anther, then *tapering to a long filiform point*, often over 1 inch in length. Lateral sepals free, tapering to fine points. Petals falcate, lanceolate, quite short. Labellum sessile, crimson, margins entire; lamina glandular with smooth surface, having two triangular calli at the base.

This small but handsome species is often found in colonies in open forest or moor land, not usually occurring in exposed places. It is easily noticed for its slender form, with the long tailed sepals, the flowers all grouped at the top of the stem. It occurs also in New South Wales, South Australia and Tasmania.

Flowers in September and October, and recorded from the South and East.

2. A. EXSERTUS, R.Br. (protruded, referring to the bending forward of the column.) "Mosquito-orchid."

Stems stouter than the preceding species, usually taller, often growing to 6 to 9 inches high. Leaf single, sessile, ovate-cordate, green above, *red below*, margins entire. Flowers 3 to 12, but occasionally found up to 20 or more; flowers reddish green, or greenish purple, quite small, pedicels short. Dorsal sepal, quite short, slightly incurved, concave, ovate, lanceolate, pointed. *Lateral sepals almost as long*, free, spreading beneath the labellum. Petals lanceolate, about half as long as the sepals. Labellum peltate, on a distinct claw, upper surface convex, densely tuberculate, except near the base. Column quite conspicuous, almost as long as the petals, widely winged.

This is more common and more conspicuous than the former species, occurring in more open land and growing under harder conditions. The flowers occur in a tall raceme, and are not always placed at the top of the stem.

This species occurs in all States of the Commonwealth, and is recorded from all parts of this State. It flowers from May to August.

10. CRYTOSTYLIS, R.Br.

(Curved column.)

Plant dwarf; leaf solitary. Dorsal sepal narrow, lanceolate, incurved, concave. Lateral sepals and petals narrow, spreading, nearly equal in length, to the dorsal

sepal, or petals a little shorter. Labellum sessile, flat, undivided, entire, with two calli at the base *produced into raised lines along the lamina*. Column elongated, incurved, winged in the upper part.

Terrestrial glabrous herbs. Leaf sessile at base of stem, usually green on both pages. Stems bearing a raceme of several flowers.

There are only two known species in the genus, one in Australia and one in New Zealand.

1. *C. RENIFORMIS*, R.Br. (kidney shaped, referring to the leaf). "Gnat-orchid."

Plant small; leaf solitary, *orbicular-cordate*, without point, *green on both pages*. Flowers from 3-6, occasionally found solitary. Dorsal sepal somewhat long triangular shaped; lateral sepals and petals narrow. Labellum as long as the dorsal sepal, and conspicuously wide.

This species is easily recognized by its green, heart-shaped leaf, somewhat firm in consistence. The labellum is quite conspicuous. It is found in every State of the Commonwealth, and in all but the N.W. in Victoria. Flowers in July-August.

11. *LYPERANTHUS*, R.Br.

(Mournful flower, referring to the gloomy colour.)

Dorsal sepal broad, erect, or incurved over the column: lateral sepals and petals narrow, all nearly equal in length. Labellum shorter than the sepals, undivided or three lobed: lamina sometimes bearing raised lines, surface of lamina or middle lobe papillose (covered with soft superficial glands). Column erect, incurved, more or less winged, as long or nearly as long as the labellum.

Terrestrial glabrous herbs, with small underground tubers, leaves 1-3, usually thick; bracts often leaf like. The plants usually dry quite black.

There are about a dozen species in the genus, which extends to New Zealand and New Caledonia. Five species are endemic to Australia, two being recorded from Victoria. One species, *L. suaveolens*, was formerly placed in *Caladenia*; while *Burnettia cuneata* was formerly referred to *Lyperanthus*.

1. *L. NIGRICANS*, R.Br. (blackish or becoming black, when dry). "Red-beak Orchid."

A stout plant, from a few inches to a foot in height. Radical leaf broadly ovate-cordate or orbicular-cordate,

fleshy, thick; stem bracts usually two, sheathing the stem, blunt, leaf like. Flowers large, 2 to 8, usually about 4, purple or with dark crimson purple stripes, ovary and pedicel included in an enveloping bract. Dorsal sepal usually white or pinkish white, with purplish or crimson stripes, much incurved, broadly lanceolate. Lateral sepals spreading, linear, free; petals similar, spreading. Labellum, light coloured, with purplish veins and dark tip, sessile, obovate, three lobed; lateral lobes erect, clasping the column, the middle one with rather blunt tip, *fringed or deeply denticulate*. Lamina with a wide smooth raised line or band between the lateral lobes. Column erect, then incurved, narrowly winged.

This plant, formerly known as "The Undertaker," on account of turning black when dried, is found in open moor or hill country. It is often reputed to flower only after a bush fire. But while it often does flower after fires, it does not depend on fires alone to stimulate it into flowering. In Western Australia, it is much more robust than in Victoria, there growing quite tall. Here it is rather a dwarf plant.

It is recorded from all States except Queensland; and from all parts of Victoria except the N.E. It flowers in September-October.

2. *L. SUAVEOLENS*, R.Br. (sweet-scented). "Brown-beaks."

A glabrous plant, from 12 to 18 inches in height. Leaf of thick consistency, linear or linear-lanceolate, channelled, 6 to 12 inches long; two or three sheathing scale leaves on stem. Flowers 2-8, rarely more, almost sessile, with bract sheathing the ovary. Dorsal sepal lanceolate, acuminate incurved, concave, often one inch in length; lateral sepals and petals almost of equal length, linear, spreading. Sepals and petals all dull purplish in colour. Labellum much shorter than sepals, the erect part broad, with not prominent lateral lobes. Calli in two rows along the claw or erect part and between the lateral lobes; the disc covered with small calli arranged in several rows. Column broadly winged.

This tall orchid is found in bush land, but is often hard to find on account of its inconspicuous dull colour. It is not always sweetly scented, as its name implies, although the fragrance is very sweet in hot, moist weather.

It is recorded also from Tasmania and New South Wales; and has been found in the S., N.E., and E. in this State. It flowers in September-October.

12. BURNETTIA, Lindl.

(After Burnett.)

Sepals and petals nearly equal, erect or connivent, dorsal sepal incurved and concave, lateral sepals and petals falcate. Labellum shorter than the sepals, undivided, sessile, erect at base, recurved at the end, with *two longitudinal raised plates along the centre* broken up into calli above the middle. Column erect, incurved, winged. Anther erect, two celled.

Terrestrial herbs, leafless at flowering time, except for a few sheathing scales. Leaf solitary. Flowers few in terminal head.

This genus differs from *Caladenia* in its habit, and particularly in having the longitudinal plates on the labellum. It is limited to a single species, which is found only in Victoria and Tasmania.

1. *B. CUNEATA*, Lindl. (Cuneate, wedge-shaped leaf.) "Lizard-orchid."

Leaf absent at flowering; stems 2 to 4 inches high, having two or three fleshy bracts. Flowers one to three, erect; much incurved, usually brownish red outside, but rarely white; white inside; stem brownish. Sepals and petals of thick consistency. Labellum shorter than the petals, broad, ending abruptly.

This is a rare species, and is only recorded from the South, in this State. Its appearance can be noted from the coloured plate. It usually hides itself in dense scrub, and almost invariably in peaty land amongst *Melaleuca squarrosa*, the "Scented Paper bark" tea tree. It flowers in September-October.

13. ERIOCHILUS, R.Br.

(Woolly-lip.)

Dorsal sepal erect, slightly incurved and concave; lateral sepals longer, spreading, elliptical, contracted into narrow distinct stipes (stalks); petals nearly as long as dorsal sepal, usually narrower, erect and spreading. Labellum sessile, much shorter, on a long erect narrow-oblong base, the margins often produced into erect lateral lobes: the lamina or middle lobe recurved, very convex, entire, the surface glandular-villous. Column erect, elongate, narrowly winged.

Terrestrial herbs, glandular pubescent or hairy, rarely glabrous. Leaf glabrous, solitary, ovate or lanceolate. Flowers pink or white, one or two on stem, rarely 3-5.

The genus is endemic to Australia, having five species, four occurring in West Australia.

1. *E. AUTUMNALIS*, R.Br. (autumn flowering). "Parson's Bands."

A slender plant, upwards of 6 inches in height; leaf solitary, radical, ovate, small at flowering time, increasing afterwards. Flowers one to three, usually white, occasionally pink and white. Dorsal sepal erect, long, green or greenish brown; lateral sepals, elliptical lanceolate, white. Petals erect, linear falcate. Labellum about as long as the petals, the erect part glabrous, the recurved part much wider, ovate with transverse ridges of reddish hairs. Column with narrow wings behind the stigma, shorter than the dorsal sepal.

This low growing autumn-flowering orchid is conspicuous in open grass lands, on account of the two spreading white petals, which have given to it the vernacular, "Parson's Bands." Under the glass, the labellum presents a very beautiful appearance, and is well worth study. The flowers come in April-May, and are usually sweetly fragrant.

The species occurs from Queensland to South Australia and Tasmania; and is recorded from all parts of Victoria.

14. *LEPTOCERAS*, Lindl.

(Thin horn, referring to the petals.)

Dorsal sepal wide, concave, erect or incurved, contracted gradually towards the base: lateral sepals about equal in length, acute, very narrow, deflexed against the ovary. *Petals* longer, *erect*, linear clavate (*clubbed*), *the clubbed part very glandular*. Labellum on a short movable claw, *much wider than long*, three lobed: lateral lobes large, dome shaped, fringed or deeply combed, with pubescent (hairy) spots on the upper convex surface: middle lobe much smaller, rounded, less deeply combed, upper surface smooth or nearly so. Column incurved, rather widely winged.

Terrestrial glabrous herbs. Leaf basal, solitary, sessile, sheathing, ovate, oblong, or broadly lanceolate, often small at flowering, increasing in size afterwards.

The genus includes one species only, endemic to Australia. Rogers records it as closely allied to *Caladenia Menziesii*, and to the genus *Eriochilus*.

1. *L. FIMBRIATUM*, Lindl. (fringed, i.e., the labellum). "Fringed Hare-orchid."

(Included by Bentham and other botanists under *Caladenia*). Glabrous or nearly so; slender stems up to 8 inches high. Flowers one to three, reddish or yellowish-brown, on slender pedicels. Petals longer than the other segments. Labellum greenish with red-brown pubescent spots.

This handsome orchid, usually found growing in colonies, is readily recognized by its very broad, deeply fringed labellum, and by the two upstanding, erect petals. It flowers in autumn and winter, and is also recorded from Western Australia and South Australia. In Victoria it only occurs in the South. There it usually grows in open grass, or moor lands, near the coast.

RECORDS OF ORCHIDS.

Mr. J. C. Goudie's note in the December *Naturalist*, is very interesting. I was quite correct in saying that *Thelymitra aristata*, Lindl. is "recorded from all districts but the north-west." A plant may be collected and not recorded; this orchid certainly had not been placed on our records from the N.W. Plant collectors everywhere are urged to advise the Club officers of their records and collections, so that our Census shall be as complete as possible. Mr. Goudie's interesting list contains another species not hitherto recorded from that district, *Caladenia carnea*. These records will be noted by the Plant Names Committee. Regarding *Caladenia tentaculata*, Dr. R. S. Rogers, now places this as a variety of *C. filamentosa*, R.Br.—E. E. PESCOTT.

A farmer friend of mine relates the following incident, which shows how confiding the Black and White Fantail, *Rhipidura leucophrys*, can be. The farmer's light-pole wagon had been standing in the stockyard, unused for some time, when he required it for a trip to Murtoa. When half way home, four miles, he stopped, and alighted to re-arrange portion of the load. A wagtail appeared, and showed signs that his presence was unwelcome. He stood aside, whereupon the bird flew beneath the wagon, on to its nest, which was built on the fetchels. The farmer continued his journey, and on arrival, placed the wagon in its old position in the stockyard, where it remained undisturbed until the wagtail brood had ranged from the nest.—JAMES HILL, Murtoa.

"Bird Study in India" (Oxford University Press, London), is the title of a small book by Miss M. R. N. Holmer, M.A., F.Z.S., which is at once an introduction to ornithology, and a concise guide to the birds of India. It is pleasantly written and attractively illustrated. The author is obviously a true bird observer, and well versed in her subject. A volume of this kind dealing with Victorian birds, would be welcomed by a host of nature-lovers.

EXCURSIONS

MILLGROVE.—On November 30th, we journeyed to Millgrove, in perfect summer weather. An ideal camping spot was chosen on the banks of the Yarra, close to the station. We enjoyed the beautiful picture of the river racing down its rocky bed with the huge gums and blackwoods on its banks, supported by wattles and tea-tree, with smaller creepers and shrubs adding their quota to the scene. Many Striated Thornbills were noted among high branches, and Grey Fantails were busy nearer to us, and more friendly. We found a nest, containing young, of the latter species.

Walking towards Warburton we explored the left bank of the stream, then, recrossing the bridge and following the road for about a mile, once more came down to the river, and followed it to the town. Just before leaving the road we passed an old homestead with magnificent specimens of English Elms, and a grand old English Oak tree. Nearly 40 species of native plants were collected.—M. R. WIGAN.

SYDENHAM AND BULLA.—Two char-a-bancs carried 39 members to Sydenham, on November 13th. On the way we observed the characteristic lava plain, sloping gently from the hills to the sea and cut by streams which are young in the characters of their banks, and old in their sinuous courses. The Organ Pipes were inspected. About half the number present then returned to the cars and went round to Bulla by road.

The remainder of the party, with the leader, went across country to the Entrenched Meander, near Bulla, where they inspected a granodiorite contact and the adjacent metamorphism. A block showing the plutonic rock moulded on to the hornfels, was found.

Any one who so desires can go over the ground, with a copy of the *Victorian Naturalist* of July, 1911, in hand. This number contains an excellent report by Mr. R. W. Armitage and others, of an excursion led that year through the same and neighbouring localities.—A. L. SCOTT.

YAN YEAN.—Nine members and friends attended the excursion to Yan Yean on December 11th. Bush flies welcomed us and were in constant attendance during the day. After a pleasant walk of about a mile the Reserve was entered, and, passing over a low hill, thickly covered with native vegetation, mainly Casuarinas, we reached the southern shore of the lake. The track along the water-side was followed for a mile. We noted some flowering plants of Salsify and numerous seedling native pines (*Callitris*). In the pine avenue the small black and yellow Cicadas were found in all stages of emergence, from the climbing nymph to the imago. Among the Eucalypts the large dark-colored species was plentiful. At this spot we searched the outcropping Silurian strata for fossils and some impressions of bivalve shells were obtained.

Retracing our steps, we examined the outflow system of the reservoir, and followed the embankment and shore line on the western side. Few birds were seen. The open water was occupied only by a dozen Musk Ducks, but with the aid of binoculars, a flock of Black Cormorants and some Black Swans were seen near the further shore. Other birds noted were Silver Gull, White-backed Magpie, Black-faced Cuckoo Shrike, Rosellas and Red-backed Parrakeets, White-fronted Heron, Kookaburra, Dusky Wood Swallow, Grey Thrush, Pied Grallina, Rufous Whistler, Bronze Cuckoo (pursued by Yellow-tailed Thornbill), Black-and-White Fantail, and Blue Wren.—A. E. RODDA.

FRANK WISEWOULD.

The announcement, in the press on November 29th, of the death of Mr. Frank Wisewould, on the previous Saturday, came as a great shock to his many friends among the members of the Field Naturalists' Club, as only a few weeks before he had been one of the prominent workers at the Wildflower Show. Mr. Wisewould was an "original" member of the Club, having been one of those elected at the first meeting, in May, 1880. In February, 1923, he, with seven other members of equally long membership, was elected a life honorary member.

Though a regular attendant at Club meetings for many years, Mr. Wisewould contributed but one paper to the Club's proceedings, "Notes of a Visit to the Chudleigh (Mole Creek) Caves, Tasmania," (*Vict. Nat.*, Sept., 1885), but as the result of establishing a country home at Pakenham Upper, in later years, he often contributed bird notes at the meeting, and on several occasions acted as leader and host to Club excursion parties in his neighbourhood. He was always keenly interested in the Wildflower Shows, and besides helping in the Hall, contributed fine collections of blooms, chiefly from Pakenham.

Mr. Wisewould was President of the Club in 1910-11 and 1911-12, and occupied various positions on the Committee of management for a total period of 16 years. He was a man of sterling character, and in his position as a prominent solicitor of the city, filled many positions and made hosts of friends. His death was caused by an acute attack of appendicitis—singularly enough, appendicitis was also the cause of his father's death. He leaves a widow and one daughter (Dr. G. Wisewould, of St. Kilda). The Club was represented at his funeral to the Brighton Cemetery, by the President and a number of other members.

EXCURSION.

HEALESVILLE.—Eighteen members took part in the Club excursion to Healesville on Saturday, November 20th. We walked to Echo Tunnel and Donnelly's Weir. The following orchids were noted:—

Pterostylis pusilla, *P. falcata*, *Microtis atrata*, *M. parviflora*, *M. porrifolia*, *M. oblonga*, *Calochilus cupreus*, *C. Robertsonii*, *C. paludosus*, *Thelymitra pauciflora*, *T. media*, *Prasophyllum Frenchii*, *P. odoratum*, *Gastrodia sesamoides*, *Dipodium punctatum* (buds only).—MRS. E. COLEMAN.



HABIT OF *CHILOGLOTTIS MUELLERI*.

The orchid, *Chiloglottis Muelleri*, is rather terrestrial than an epiphyte, according to observations made by Mr. F. J. Bishop and myself, when we travelled across the Baw Baw plateau, December-January, 1923-4-5. We found this species growing on Mount Erica, beneath *Melaleuca* and other bushes; even among grass and between rocks, right out in the open. It was very abundant at 5,000 feet. In the morasses it is very robust, much larger in leaf than *C. Gunnii*, while the flower is as large. The day's journey across Mt. St. Phillach (5,140 feet) to Fali's Creek, 23 miles, revealed this orchid as terrestrial. On the Thomson River, in the fern gullies, it was noted in thousands (not hundreds). We made a special search of the tree-fern trunks, but did not discover one specimen on these. This species is also found in Tasmania, growing as a terrestrial.

P. Tadgellianum, Rogers. Bogong Leek-orchid. Mr. F. J. Bishop and myself, also the Rev. A. C. F. Gates, have recorded this species from the Baw Baw Plateau, where it is very plentiful. This was in 1923-24-25 and 26. Mr. Gates forwarded specimens to the Herbarium. At 5,000 feet and below that altitude, it is abundant from Mr. Erica to Mt. Whitelaw, a distance of about eight miles.—W. H. NICHOLLS.

THE ORIOLE.

For many years a grape-vine, which is trained against the east side of our house, has suffered from attacks of vine moth caterpillars. It has been stated, from time to time, that the Pallid Cuckoo (*Cuculus pallidus*) is the only bird which will destroy these caterpillars. The Cuckoo assuredly does good service in this respect as I have known the bird to clear a vine of them; but Cuckoos being rather scarce in this district—Sperm Whale Head—usually they are not at hand when needed. This season the caterpillars are as numerous as in previous years, and one day recently I observed two Orioles (*Oriolus sagittatus*) feasting on the pests; this diet appeared to be palatable. I was surprised to see the Orioles, as they are rare birds in the locality, seldom coming about the house; usually they are rather timid. The vine is opposite a window, and evidently one of the birds was deceived by its own reflection in the glass, as it darted straight at the window and sustained a sharp knock. Wattle-birds frequently hunt for food around the gardens, but they do not fancy vine moth caterpillars, preferring the smaller ones to be found among the vegetables. I am hoping that the wattle-birds will permit the Orioles to "make themselves at home."—FRED. BARTON, JNR.

FLORA OF SOUTH AUSTRALIA

Australian botanists and plant collectors will welcome the third instalment of Mr. J. M. Black's "Flora of South Australia," which has just been published by the South Australian Gov-

ernment as one of the series of handbooks issued by the British Science Guild (South Australian branch). When the book is completed by the publication of the fourth part, it will rank with the works of Mueller, Maiden, Bailey, and Rodway. This new part consists of 156 pages, embracing 33 families, Meliaceae to Scrophulariaceae, 540 species, and includes 18 species, 14 varieties, and 10 new combinations for which the author is responsible.

Regarding the nomenclature, Mr. Black has adopted combinations which he finds conform to the rules of the Vienna Conference of Botanists; for example, *Lhotzkya alpestris* for *L. genetylloides*, and *Daucus glochidiatus* for *D. brachiatus*. He is careful to show reasons for the changes, and to give dates where priority is in question. Our Plant Records Committee will doubtless consider the advisability of adopting the changes when publishing the next Supplement to the Census. These changes may be pronounced vexatious and unnecessary, but they are inevitable, and are justified by the evidence which Mr. Black has been able to bring forward.

The study of naturalised aliens is very important from an economic point of view, and the book is rendered much more useful by the inclusion of the descriptions and many drawings of the plants which have become naturalised in the sister State. Few vernacular names are given. Three-fifths of the plants enumerated are also Victorian species, and those who are responsible for the publication of the vernacular names in the Census of Victorian Plants, would like to have seen these names quoted in Mr. Black's book, which will be largely used by amateur botanists. In all books of this nature vernaculars should be given; they are as important, in their way, as scientific names, and were they generally used by authors, botany would become more popular.

BIRDLAND TRAGEDIES

Early in November, 1926, at Ashburton, a Magpie-lark, *Grallina cyanoleuca*, was sitting on a nest, 35 feet from the ground, in a tall gum sapling. At that time there were four eggs in the nest, but three days later the eggs were missing and the nest contained the decapitated body of a Goldfinch. The disappearance of the eggs was regarded as due to one of the bird-nesting parties that were then committing much destruction among birds in the district. On December 14th the headless body of an Indian Mynah was found in the nest; the bird had been dead only a few days. On the same afternoon a pair of Regent Honeyeaters, *Zanthomiza phrygia*, was observed, busily engaged feeding two young ones, in a nest 75 yards away. Next morning these nestlings were found dead in the nest; the head of one had been bitten off. The bodies of all were in a good state of preservation, and apparently the birds had been wantonly destroyed. The locality is seldom visited by hawks or falcons at this time of the year, but Boobook Owls and Frogmouths are not uncommon there.—D. DICKISON.

PROPERTIES OF LOMATIA FLOWERS

Lomatias, decorative Proteaceous plants, are in full bloom now (January) in our bush, and it is well to direct attention to an attribute possessed by these flowers, that is not generally known, seeing that surprise has been expressed that none of the species is placed on lists of honey-producing plants.

Some research work on the flowers of certain Proteaceae has

been published in the *Proc. Roy. Soc., Queensland*, the authors being F. Smith, B.Sc., and C. T. White, F.L.S. One species, *Lomatia silaifolia*, which we grow in our gardens, was reported to possess properties which killed flies. Chemical tests were carried out, with the result that the anthers, style, and stigma gave strong positive reaction to hydrocyanic acid gas (H.C.N.). The foliage, petals, capsules, and seed all gave negative reaction, so that the poison is confined to the reproductive organs, which are regularly visited by bees. The authors of the paper conclude: "The possibility of *Lomatia* flowers proving dangerous to bees owing to the cyanophoric properties of the pollen seems to us worthy of consideration by entomologists and apiarists."

Flowers of the Silky Oak, *Grevillea robusta*, also were submitted to similar tests, and the pistil, capsules, and seed gave a strong positive reaction also to the H.C.N.—E. E. PEScott.

PARASITIC HYMENOPTERA.

For the student of parasitic Hymenoptera, more especially the Proctotrypoidea, Belgrave is a good hunting-ground. Mr. Alan P. Dodd, Officer in Charge of the Prickly Pear Investigation, Queensland, during Christmas holidays, visited the district, and he reports that he obtained a fine lot of material. Mr. Dodd specialises in the study of Diapriidae and Belytidæ, both of which families are well represented at Belgrave. These minute insects are parasitic on Dipterous larvae. They are collected mainly by use of the sweeping-net.

Several species in the family Ceraphronidae, also Dipterous parasites, were taken by Mr. Dodd; and one species in the small family Proctotrypidae, whose members are parasitic on Coleopterous larvae. The large family, Scelionidae, egg-parasites of various orders, was, strange to say, poorly represented, but three species of the genus *Scelio*, Latreille, parasitic on grasshoppers' eggs, were collected; these insects usually are taken running over bare ground, where the host grasshoppers occur.

Outside Queensland, very little collecting has been done; indeed, not more than six species in the whole superfamily have been recorded from Victoria. Mr. Dodd anticipates finding many new species in his Belgrave collections. The Proctotrypoidea group is little known to the average collector. Although of large dimensions, it is rather dwarfed by the immense size of the other parasitic group, the Chalcidoidea.

Mr. Dodd, who is a son of Mr. F. P. Dodd, of Kuranda, Queensland, has done excellent work in his special field. He will be glad to receive Victorian specimens of parasitic Hymenoptera—species in the families mentioned above.

LYCAENIDAE AND ANTS.

The larvae of many of the butterflies of the family Lycænidæ, the "blues" and "coppers," are attended by ants, which run about over their bodies. The larvae, apparently, secrete a sweet substance, similar to that secreted by the Aphidæ and Coccidæ, and this is eaten by the ants. The late Mr. L. Thorn, in his "Notes on the Life Histories of Some Victorian Lycænid Butterflies" (Vict. Nat., July, 1924), states that "if the ants were not in the breeding-box to attend the larvae, the secreted liquid would form into a mould or mildew, which kills a number of species of Lycaenid larvae every season."

The ants are undoubtedly a protection against the attacks of ichneumon flies, but are, apparently, not indispensable to the well-being of the larvae. On April 20th, 1926, I found a larva of the "Moonlight Blue" butterfly, *Miletus delicia delos*, under the bark of a black wattle, *Acacia decurrens*, at Spring Vale. The larva was about one-third full size, and as is invariably the case with this species, was attended by small black ants (*Crematogaster*, sp.); but one only of these ants remained with the caterpillar when it was placed in a box to be taken home. This ant died within a few days, and for six months, the larva lived without the services of ants.

Two pieces of wattle-bark were attached by a rubber band to a small bottle containing the food plant (black wattle), and the bottle was placed under a small glass dome. One of the pieces of bark was fastened to the side of the bottle by a web spun by the larva, forming a sort of nest in which the larva remained all day, coming out at night to feed. During May, June and July, it fed sparingly and in August ceased to eat for some time. It remained in its retreat and appeared to be sick. I thought it was going to die, but one day I found that it had cast its skin and seemed to be quite healthy. It then fed freely, and it increased considerably in size during September and October. The larva pupated between October 20th and 24th, and the butterfly, a female in perfect condition, emerged on November 26th.—W. H. ROGERS.

The Mornington Naturalists' Club's local collection of orchids has been considerably increased, the following species having been added:—*Pterostylis acuminata*, *Prasophyllum odoratum*, *Thelymitra carnea*, *T. flexuosa*, *T. ixioides*, *Microtis porrifolia*, *Caladenia coerulea*, *C. clavigera*, *C. cordiformis*, *C. Menziesii*, *C. dilatata* (rare yellow and green form), *Diuris punctata*, and *D. sulphurea*.

Field Naturalists' Club of Victoria

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V. Miller.

EXCURSIONS.

SATURDAY, JANUARY 15.—Botanic Gardens. **Object:**
Aquatic Zoology. **Leader:** Mr. J. Searle. **Meet at office**
gate at 2.30 p.m.

SATURDAY to MONDAY, JANUARY 29-31.—Warburton.
Object: General. **Leader:** Mr. A. E. Rodda. **Meet at**
Flinders Street Station for 1.38 p.m. train. The party will
be accommodated at "Maroonda," East Warburton (4 miles
from Warburton), at cost of 10/- per day each. Members
wishing to take part are asked to hand their names to the
Leader not later than January meeting.

SATURDAY, FEBRUARY 12th.—Botanic Gardens. **Object:**
Links with the Past. **Leader:** Mr. F. Chapman, A.L.S.
Meet at office gate at 2.30 p.m.

EASTER EXCURSION. APRIL 15th to 19th.—Toolangi. **Object:**
General. **Leader:** Mr. A. E. Keep. A few vacancies still
available, but immediate application necessary. Names,
together with £1 deposit, may be handed to the Leader not
later than January meeting.

NOTE.—As it is proposed to publish a list of members in the April
issue of the *Naturalist*, members are requested to notify the
Hon. Secretary as early as possible of any changes of address,
and particulars of the branch of natural history in which they
are most interested.

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THE JOURNAL AND MAGAZINE

— OF —

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Published February 7, 1927

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The Author of each article is responsible for the facts and opinions recorded.

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1927

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th FEBRUARY, 1927.

1. Correspondence and Reports.
2. Election of Members.

AS ORDINARY MEMBERS

PROPOSER:

SECONDER:

Mr. W. G. Chisholm,
198 Albert Street,
East Melbourne.

Mr. L. L. Hodgson Mr. E. E. Pescott,
F.L.S.

Mr. H. Howard,
"Quendon," Chapel St.,
St. Kilda.

Mr. A. E. Keep Mr. A. G. Hooke

Mr. W. H. McMillan,
21 Weigall Street,
South Yarra.

Mr. J. Searle Mr. A. G. Hooke

Mr. John Mason,
3 Rowena Parade,
Richmond.

Mr. J. Searle Mr. L. L. Hodgson

AS COUNTRY MEMBER:

Dr. R. S. Rogers,
118 Hutt Street,
Adelaide, S.A.

Mrs. E. Coleman Mr. F. Chapman,
A.L.S.

3. Nominations for Membership.
4. General Business.
5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural specimens, should exhibit them at the Club's meetings, and, if possible, make a few remarks concerning them; also furnish the Hon. Secretary with written particulars for record in the Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

6. Microscopical Evening (Aquatic Life).

Microscopical Slides and Aquaria will be exhibited.

Members possessing microscopes are requested to make them available, and to communicate with Mr. J. Searle, 274 Collins Street, who has charge of the arrangements.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a short account thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

The Victorian Naturalist

VOL. XLIII---No. 10. FEBRUARY 7, 1927.

No. 518.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, January 17th, 1927. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 140 members and friends were present.

The President welcomed Rev. H. M. R. Rupp, of Paterson, New South Wales, Mr. F. C. Tooke, of South Africa, and Mr. S. R. Mitchell.

CORRESPONDENCE.

From Chief Inspector of Fisheries and Game, stating that he had no intention of removing the Kookaburra from the list of birds protected under the Game Act.

From Mr. T. G. Sloane (Young, N.S.W.), advising donation of a copy of Dr. Tillyard's "Insects of Australia and New Zealand," to the Club's library.

REPORTS.

Reports of excursions were given as follow:—Mitchell Gorge, Mr. C. Daley, B.A., F.L.S.; Botanic Gardens, Mr. J. Searle.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Mr. J. Halliwell, 23 Grace-street, Moonee Ponds; Mr. L. Byrne, "Inglesby," Albert Crescent, Surrey Hills; and Mr. C. Deane, 9 State-street, Malvern. As Country members:—Mr. Robt. A. Kent, Narre Warren; and Mr. Alex. D. Selby, c/o Mr. W. Chequer, Quantong.

LECTURETTES, &C.

The President introduced the subject of the evening: "The Stone Age Man," and stated that there was ample scope in Australia for the collection of aboriginal stone weapons and implements. He also referred to the valuable work done in this direction by such enthusiasts as Dr. G. Horne, Mr. A. S. Kenyon, Mr. W. Gill, and others.

Mr. A. S. Kenyon gave an illustrated address, entitled, "An Afternoon in an Aboriginal Camping-Ground," in the course of which he described, and explained the uses of, many forms of stone and bone implements, such as scrapers, knives, and axes. Several types of aborigines were depicted on the screen, and their characteristics referred to by the speaker. Mr. Kenyon urged the collection of aboriginal relics for the benefit of posterity.

Mr. E. S. Anthony gave a short description of several stone axes and other weapons which he had on exhibition.

The President and Mr. Chas. Barrett each spoke briefly on the interest and importance of ethnology.

EXHIBITS.

By Mr. A. S. Blake: Australian Roller or Dollar-Bird, *Eurystomus pacificus*, from Molesworth; stone axe from Cathkin.

By Mr. A. A. Carter: Mould of the unique fossil gasteropod, *Cantharidus multicinctus*, Cresspin, found in the Janjukian (Miocene) of the Flemington railway cutting. The original type specimen is from Keilor.

By Mr. F. Chapman, A.L.S.: Chellean implement, Sussex, England; eoliths from Ightham, Kent, England.

By Mr. C. Daley, B.A., F.L.S.: Water-worn pebbles; robin's nest of moss and lichen, from Mitchell River; stalactitic limestone; Supplejack on Mock Olive, *Notelaea longifolia*; Spear Grass-tree, *Xanthorrhoea hastilis*; Scaly Phebalium, *P. squamulosum*; Mountain Correa, *C. Lawrenciana*, all from Deadcock Creek.

By Mr. H. P. Dickins: Photographs and sketches, Mitchell Gorge, Xmas Excursion, 1926.

Mr. J. A. Kershaw, for National Museum: Aboriginal stone axes; flaked stone axe or pick, of quartzite, hafted; husking stone, used for breaking of hard seeds; hammers (for pounding, etc.); stone chisel or gouge, the shaped stone attached to each end of the handle by grass-tree resin, used for making the grooves seen on shields and other wooden implements; spear-heads of stone and glass, serrated, some showing method of fixing to haft of spear with resin; tools from kangaroo limb bones, used for making fine serrations on spear-heads—pieces of fencing wire also used for same purpose when available; knives of quartzite, hafted with resin, and sheath for same.

By Mr. W. Gill: Skull of aboriginal, found buried in sand, Kew Golf Links; stone implements.

By Mr. V. H. Miller: Rare Flannel-flower, *Lachnostachys Walcottii*, from Murchison district, W.A.

By Mr. A. S. Kenyon: Large series of aboriginal stone implements.

By Mr. E. S. Anthony: Stone implements, Australian and Tasmanian.

By Mr. W. H. Nicholls: Water colour drawings of orchids, including *Diuris punctata*, Smith, showing purple dots from which the plant received its name; *Diuris fastidiosa*, Rogers, a species recently described from specimens found by the exhibitor at Tottenham; *Calo-*

chilus imberbis, Rogers, a beardless *Calochilus*, also new to science, collected by Mrs. F. Rich, at Rushworth. *Calochilus cupreus*, Rogers, Copper-beards; *Cryptostylis longifolia*, R.Br., Large Tongue-orchid; *Caleana Sullivani*, F.v.M., Spectral Duck-orchid—*Caladenia pumila*, Rogers, Dwarf Caladenia; and *Calochilus paludosus*, R.Br., Red-beards.

By Mr. W. H. A. Roger: Specimens of the Imperial Blue Butterfly, *Ialmenus evagoras*, bred from pupae collected on the Mitchell River, Xmas, 1926; specimens of the Wood White Butterfly, *Delias aganippe*, bred from larvae collected at Cheltenham, Dec., 1926.

By Mr. A. E. Rodda: She-oak scale, and galls formed by the same.

By Mr. C. Barrett: The Puralka Flint.

By Mr. J. Searle: Larval stage of *Xiphocaris compressa*, the so-called "Freshwater Shrimp"; mounted specimens of *Plumatella repens*, *Boeckella symmetrica*, *Simosa gibbosus*, *Chironomus* larva, *Ceratopogon* larva, shown under the microscope; also drawings of some of the commoner pond-animals.

By Mr. A. J. Williamson, per Mr. J. A. Kershaw: Skull of aboriginal from Nerrin Nerrin, near Streatham, Victoria, collected more than 50 years ago; the nasal cavity and eye sockets are rather larger than usual. Frontal bone of skull from Bermagin, New South Wales, showing very low forehead. Sacrum of aboriginal from Bermagin, N.S.W. Two rasps of vesicular basalt from Eddington and Bet Bet, Victoria; one showing an artificial groove, suggested as a grip for the fingers.

An interesting series of National Museum postcards, illustrating the Kangaroo, Black Swan, Platypus, and Lyre-bird groups, native camp, ceremonial decorations of Australian aborigines, the Main Hall, etc., has been issued. The cards, which are finely printed, and form excellent souvenirs of the Museum, are on sale, price 2d. each, at the Public Library, and the Book Lovers' Library, Collins-street, Melbourne. Doubtless many sets will be sent overseas, for the Museum cards are attractive as well as instructive. One subject, the Samoyede Sledge, should appeal especially to children.

The report in the press, of the death of a man after he had been bitten by a Frilled Dragon or "Jew" Lizard, *Amphibolurus barbatus*, brings to my memory that an aboriginal at Kewell, 54 years ago, warned us to be careful, for sometimes a "frilly jaw" caught a dog by the ear, and the dog died from the effects of the bite. These lizards, which I have observed feeding upon small black ants, change their colours. On a very hot day it is a common thing to see them, on fence posts, appearing quite yellow; while in cold and cloudy weather, they are dark-coloured. A specimen collected when yellow, after death, became nearly black.—JAMES HILL.

STONE IMPLEMENTS ON ABORIGINAL
CAMPING-GROUNDS.

BY A. S. KENYON.

The term, camping-ground, includes "kitchen middens," "myrniong mounds," "ovens," "shell-mounds," "factory sites," "workshops," etc. The Australian aboriginal made no difference. Any suitable site was all of these, and a burial ground as well. A camping-ground was generally on sand, or at least on very sandy soil. If the soil was not sufficiently non-adhesive, a mound was built up, circular in plan, and rounded in shape, of the debris of cooking operations, burnt clay, burnt loam, bones, shells, and other debris.

Water in the immediate vicinity was essential, though its quality was not of importance, and, of course, access to food supplies, such as shellfish: on the coast, *Turbo undulatus* (the Green Whelk, or Warriner), *Haliotis* ("mutton-fish"), *Mytilus* (mussel), *Venus* (cockle), *Patella* (limpet), *Donax* (pipi), *Scutus* ("elephant-fish"); in fact, all kinds of edible molluscs, worms, fishes, and also, in favored places, the seal and the whale. Inland from the sea, the rivers yielded *Unio* (fresh-water mussels), *Astacopsis serratus* (crayfish), *Parachaeraps bicarinatus* (yabbie), *Oligorus macquariensis* (cod), *Copidoglanis tandanus* (cat-fish), *Ctenolates ambiguus* (perch), *Anguilla australis* (eel), and many other animals. Roots of all kinds, seeds of many plants, and a host of insects and their larvae, added to the larder.

The obtaining of the foods mentioned was the work of the gin or lubra, except the trapping and spearing of fish. Hunting, of a sort, was left to the male. The prey included kangaroos, wallabies, Emus and Plain-turkeys on the ground; pigeons, parrots, cockatoos, and other birds in the air; ducks, swans, pelicans, and herons on the water; 'possums (*Trichosurus*), Koalas (*Phascolarctus cinereus*), and flying plalangers (*Petauroides*) in the tree; and Wombats (*Phascalomys mitchelli*), Bilbeys (*Peragale*), and Rat-Kangaroo (*Potorous tridactylus*) in the earth. To these delicacies were added snakes, lizards (notably monitors, or goannas), and tortoises.

Camping-places may be roughly divided into three classes. First: those of an extremely temporary nature, where the remains are almost wholly food; implements and cooking-stones being rare; second, those where good shelter was obtainable, and varieties of food accessible;

where implements are generally sparse and of a crude nature; and third, those of a permanent nature, where aborigines were almost always to be found, and where the old men and women of the tribe stayed at home to carry on their arts and crafts. The first evidence of a camping-ground is the presence of foreign stones. These may be implements or tools, no matter how primitive, or they may be cooking-stones. Careful examination will show their nature. The second evidence is that of the presence of food remains. If there are large quantities of shells, the proportion of edible species is a guide, and in the case of univalves, the shell generally is broken in some place—done to facilitate removal of the animal.

Raised beaches, which are frequent around Port Phillip, have been mistaken for kitchen-middens. At Point Cook and at Altona, the middens merge gradually into old beaches. In Victoria, at almost every place where sand has drifted, leaving the under-surface exposed, will be found stone and food remains. If in a locality favourable for food and water, a full range of the stone implements of the locality will be obtained. Anything resembling an implement, if formed from local stone, must be viewed with the utmost suspicion, as fire, sun, frost, impacts from water or wind action, or from wandering animals, may cause fractures and give rise to quite respectable "eoliths." Similarly, foreign stones need very careful examination for some indication of the reason for their appearance on the camp-site.

Sometimes are discovered little caches of unused quartz pebbles, to be used after as hammers; of portions of diabase or greenstone to be formed into axes; and of flat pieces of sandstone to be employed for grinding. Foreign stones may, then, in general be accepted as artefacts either in esse or in posse. Exceptions are gizzard-stones. These, which have roughly deltoid faces, are sometimes two inches in length, and in such case, have been obtained from an Emu, slain by the black hunter.

The prevailing stone remains, after the fire-stones have been examined and accounted for, are fragments of quartzite, flint, tachylite, and similar hard and brittle rocks. At first, these are picked up indiscriminately, but shortly closer examination reveals that they fall into distinct groups: (a) small but definite shapes, mostly retouched or secondarily chipped in regular fashion; (b) larger shapes, much less definite, with secondary working of a much coarser nature; (c) similar flakes, but

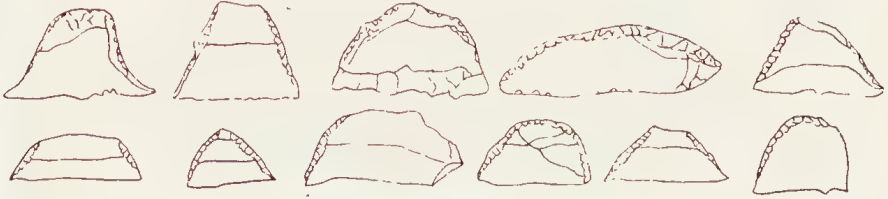
without retouching; (d) large pieces with coarse chipping; and (e) cores or nuclei, from which flakes have been struck. By far the greater number show no sign of working. These cannot, however, be classed as "wasters," as is customary, no implement being discoverable the making of which would result in such remains.

The greater part of a blackfellow's needs in the way of cutting, whether flesh, skin or wood, was met by the sharp edges naturally resulting in the striking off of flakes. From the nature of things, these flakes generally assumed a leaf-like shape, with one or more distinct median ridges, a more or less triangular cross-section, and a well-marked bulb of percussion at the butt. The finer-grained the stone and the more conchoidal the fracture, the more perfect the leaf-shape, the ridge and the bulb. With the coarser-grained, less silicified rocks, the more imperfect the flakes until the features mentioned become hardly recognisable. It is to be feared, however, that our black brother was not troubled about these departures from type. He was a poor, primitive creature, who allowed the material available to govern him, and did not attempt the impossible.

Just as his successor, the white man, when he breaks a piece of window-glass or a bottle with which to shave down his golf club shaft to make it more whippy, or to smoothen a handle for some tool, uses it for a few strokes only until the edge dulls, and then throws it down, so acted the black man. The so-called waster was a tool, and the principal one of the aboriginal journeyman. But there were specialists, generally old men, not supple enough for the hunt. From the type flake of elongated triangular shape, several quite distinct implements, though probably for one general purpose, were evolved. The most important and widespread is that one sometimes designated the "chatel perron," or "chipped back" knife, though "crescent" is a safer term. It may be stated at once that, whatever else it may be, it is not a knife; that is, the edge formed by the intersection of the two side planes, is not used for cutting or for any other purpose.

Those acquainted with the Australian aboriginal well know that if there be an edge sharp enough to use for cutting, he will not waste time and energy chipping at other parts of the implement, especially as such an edge being necessarily of an acute character will not retain its keenness for more than a few strokes. The misconcep-

Plate XVI.



CRESCENTS.

No chipping on edge unless shown in sketch. Natural Size.
Reverse plain in all cases.



POINTS.

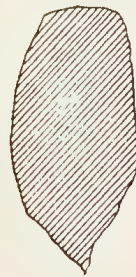
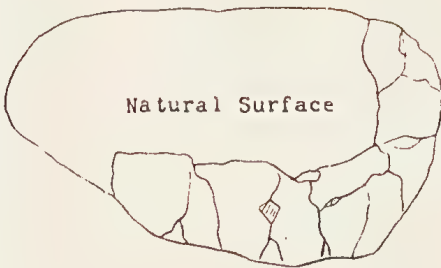
No chipping on edge unless shown in sketch. Natural Size.
Reverse plain in all cases.



GOUGES.

Elevation.
PLANES.

No chipping on edges unless shown in sketch. Natural Size
Reverse plain in all cases.



PEBBLE CHOPPER. Natural Size.

tion probably, is due to the fact that all the implements so termed and described by various European investigators, were formed from a high quality stone, which invariably yielded a fine-looking cutting edge. Although some of the stone available to our native was of similar quality, much was of a coarser texture.

An inspection of the specimens, as gathered, will reveal quite a number without a cutting edge worthy of such a description, while as many are minus the chipped back. The invariable characteristic is chipping, or retouching of the sides or wings of the implement, these being, in some instances, so prolonged as to give a distinct "cocked-hat" appearance. Chipping, often of such fineness as to call for the use of a hand-glass to discern, is invariable at the points and sides, and generally extends right around the back. This is frequently carried to such an extent that the implement becomes bow-shaped, and is often extremely elongated. One of these elongated types broken in the centre, will give two implements of the class known as "points." These are found, as separate implements, in great numbers; but from their merging into the previous class, their use is probably similar. This use cannot be definitely stated, as no person in close contact with the blackfellow while still using them, has left any record of their purpose.

Chipping on one edge only necessarily results in a working edge, which is in one line, or as nearly so, as the under-surface is nearly a plane. Hence, for scraping, planing, carving and grooving tools, chipping on one side only is the one feasible way of turning out the desired implement. Nothing is more erroneous than the idea that such a method of manufacture is an evidence of lower civilisation. Implements chipped from both sides are either chopping implements, or are weapons which call for penetration. The wavy, undulating edge thus produced is not suited for pressure work, such as is called for in the fashioning of wooden implements, or the dressing of skins.

As universal as the "crescent," is the gouge or adze, another graving tool. It is circular, or nearly so, in shape, and is chipped in much the same way. Like the "crescent" and its varieties, it was hafted, or rather fixed with gum, in the end of a stick, so that considerable pressure could be exerted upon it. It was probably used for grooving, the favourite method of ornamenting clubs, boomerangs, and other weapons. It has a great range in size, varying from one quarter of an inch to

three inches in diameter. Finally, of the smaller chipped implements, come the "planes," although some of them are of large size. These have in other parts been called cores: but they are implements, and are in parts very numerous.

A large and nondescript class is that including "scrapers." These are not unlike the gouges and other smaller implements, but have no defined form or systematic chipping on their edges. Some have projecting points, definitely purposeful, and probably groovers: others have re-entrant notches, and were probably spear scrapers or pointers. In some places, these more or less worked stones are as numerous as the untouched flakes. Like all these retouched implements, they are Australia-wide, and also world-wide. The output of primitive man in other parts of the world, was apparently much the same as that of the Australian, for their stone implements are in every way identical.

Still keeping to the cutting group of stone implements, we find numerous chipped pebbles. These, which may be called choppers, as they hardly merit the term axe, are easily the most important of Australian aboriginal stone implements, and greatly outnumber the ground-edged axes. Where pebbles of sufficiently good stone for this purpose, though probably not good enough for the axe, are numerous, hundreds may be picked up at a camping-place, where not more than one or two ground-edged axes, possibly none, will be found. Their use is not better known than that of the smaller chipped implements. Sometimes made from stone tough enough for a better implement, they display a series leading right up to the neolithic or ground-edged axe.

The under or unchipped surface of the pebble-chopper, in most cases, has a natural bevel, similar to that of the ground implement. On the chipped side, the surface is, of course, irregular, with certain protuberances. Occasionally, instead of chipping or knocking these off, the native workmen rubbed or ground them down. The advantage of this method is manifest: the practice extended until nearly the whole of the chipped side was ground. The other, or natural, pebble side was then found to be improved by a little grinding, with the result that the ground-edged axe emerged. The term ground-edged is used, for the term "polished" is frequently inapplicable, and is merely a bad translation of the French word "poli." Grinding, in almost all Australian axes, is confined to the cutting edge.

Undoubtedly, the first use of stone by man was for pounding or hammering, the breaking of a nut, the crushing of a seed, or the bruising of a root. The broken pieces resulting gave him his first cutting tool. These were used as knives, or saws, the result desired being obtained by a serrated edge drawn along under pressure. For such work the desirable stone was one brittle, but very hard. The cutting edge was always obtained by breaking, the brittle quality precluding any advantage being obtained by grinding. The chopping implement, the later development, called for an exceedingly tough stone to stand the impact, and a tough stone could not be very hard. This was the big step in human advancement from the saw-knife to the chopper, neither of which was ground.

From the completeness of this series, most important inferences can be drawn. If the complete chain of development is there—if is found what may be termed an embryo-genetic series of implements—the conclusion is that the culture developed locally. If there occurs a marked gap between the low class forms of scrapers and cutters, found universally, and the highly developed, ground and fashioned implements, then it is a fair assumption that the culture is migrant, and has been carried to the place. On this hypothesis, all, or practically all, the European cultures are migrant, and their sequence in geological horizons is no proof of their sequence in cultural development. The Australian and Tasmanian implements have been locally developed. Australia must consequently have been peopled, in the beginning, by a most primitive, stone-using people.

Among the various stones scattered round are numerous quartz pebbles. These are generally hammers or pounders. Sometimes the more perfectly shaped ones were used for games, like dumps, marbles, etc. No attempt was made to shape the hammers, as their existence was short and their usefulness not improved thereby. Occasionally a hammer was made from greenstone or diabase (the axe stone), and its toughness and consequent longevity lead to finger-grips being made for better handling. Anvil-stones, showing signs of blows, are frequent. These often were used until the hollow resulting from continued blows became so deep that the stone broke in two.

Grinding-stones, both upper and lower, pieces of raddle, or red ironstones, cores, or nuclei from which flakes have been struck, complete the series of primitive stone implements to be found on the camping-grounds.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART VI.

15. CALADENIA, R.Br.

(Beautiful Glands).

Dorsal sepal erect, incurved over the column, or more rarely retracted, usually narrow, lateral. Sepals nearly equal to it, but flat, spreading or reflexed. Labellum often on a movable claw, erect at the base, undivided or 3-lobed; the lateral lobes erect, when present; the middle lobe or upper part of the undivided labellum recurved: the margins often fringed or toothed: the lamina with sessile or stalked calli, arranged in two or more longitudinal rows or irregularly scattered or crowded. Column erect or incurved, more or less two-winged in the upper part. Another terminal, two-celled, more or less oblique, usually pointed, valvate. Pollinia 4, granular. Stigma below the anther, circular and disk-like.

Terrestrial herbs, generally very hairy, sometimes only slightly so, originating from underground tubers, the more recent tubers generally found below those of last season; tubers often sheathed in successive layers of fibrous wrappings. Leaf more or less hairy, solitary, elongate, generally linear-lanceolate or oblong, from within a sheathing scale close to the ground. Flowers solitary, rarely 2 or 3, or in a raceme of upwards of 6, on an erect scape with an empty bract: flowers usually erect, and variously coloured.

Usually known as "Spider-orchids," especially those species carrying long-tailed sepals, this attractive genus is known all over the Commonwealth. One species, *C. Menziesii*, is glabrous, all of the others are hairy, some very much so. The reproduction of this genus presents some very interesting features, see (7).

There are upwards of 60 species, 54 of which are recorded from Australia, so that this is almost exclusively an Australian genus. Three or four species are known from New Zealand. *Caladenia* finds its highest expression in West Australia, where 35 species are recorded. Victoria occupies second place, with upwards

of 20 species. Queensland has only 5; New South Wales 16; Tasmania 12; and South Australia 18. The Australian species are all endemic, with the exception of *C. carnea*, which is recorded from Java.

SECTION 1.

Flowers usually in shades of yellow, green, red-brown, or white. Lateral sepals elongate, constricted into acuminate or caudate points; petals not longer than sepals: *two sessile yellow glands at base of column.*

C. cardiochila, *C. cordiformis*, *C. leptochila*, *C. reticulata*, *C. clavigera*, *C. Patersonii*, *C. pumila*, *C. dilatata*.

SECTION 2.

Flowers crimson or cream-coloured. Lateral sepals elongate, contracted into caudate (tailed) points; petals not longer than the lateral sepals; *no sessile yellow calli at base of column.*

C. filamentosa, and var. *tentaculata*.

SECTION 3.

Flowers pink and white; petals erect, longer than the lateral sepals; *no sessile yellow calli at base of column.* Leaf glabrous. Petals red, clavate, lateral sepals white.

C. Menziesii.

SECTION 4.

Flowers pink, white, or blue: perianth segments all similar in shape and color: upper one usually erect, others spreading, relatively much wider and shorter than on Sections 1 and 2, never produced into long points. *No sessile yellow calli at base of column.*

C. latifolia, *C. carnea*, *C. praecox*, *C. alba*, *C. congesta*, *C. angustata*, *C. testacea*, *C. iridescens*, *C. cucullata*, *C. coerulea*, *C. deformis*.

SECTION 1.

1. *C. CARDIOCHILA*, Tate. (heart-shaped labellum). "Fleshy-lip *Caladenia*."

Slender, hairy, 6 inches to 10 inches in height. Leaf slender, lanceolate, hairy: Flower single, rarely 2, pedicel slender. Perianth segments brownish red, with yellow margins. Dorsal sepal linear-lanceolate, erect incurved: lateral sepals much wider, spreading, flat. Petals much narrower, linear-lanceolate, spreading or depressed. Labellum on a narrow movable claw; *cordate or broadly ovate*; undivided, margins entire with a conspicuous dark-brown thickening round the apex: rather flat, erect at base; colour reddish-brown or yellow with dark divergent veins: *lamina with 2 (rarely 4) rows of dark clavate fleshy crowded calli.*

This orchid is figured in colours in the *Proc. Roy. Soc. Vic.*, Vol. XXIII. (1916), under the name of *C. Cairnsiana*. The labellum is very fleshy, and quite heart-shaped. It is a rare species, occurring at Grantville, in Gippsland, also in E. Gippsland, and near Murrayville, in the Mallee. It also occurs in South Australia. Flowering season, Sept.-Oct.

2. *C. CORDIFORMIS*. Rogers. (heart-like labellum). "Small Spider-orchid."

A very hairy robust plant, upwards of a foot in height. Stem and leaf hairy, with a single bract on the stem. Flowers 1, rarely 2, with stem bract. Lateral sepals *greenish, with a broad red-brown stripe* down the centre; spreading; dorsal sepal usually erect and incurved over the anther; greenish yellow, having three brownish veins. Lateral sepals spreading, greenish yellow, with reddish brown central stripe; lanceolate. Labellum movable on short claw; half length of petals and sepals, *widely cordate*; incurved at tip, margins entire; indefinitely three-lobed; lateral lobes wide; middle lobe dark red, broadly triangular, recurved, apex rather blunt, margins slightly crenulate. *Calli in 4 rows (rarely 2)*, fleshy and dark red in colour.

This species was erroneously known for many years as *C. Cairnsiana*. It is widespread in the S.E. and N.E., the dark brown colour scheme generally distinguishing it. It flowers in Sept.-Oct., and is not recorded from any other State.

3. *C. LEPTOCHILA*. Fitz. (thin labellum). "Narrow-lip Caladenia."

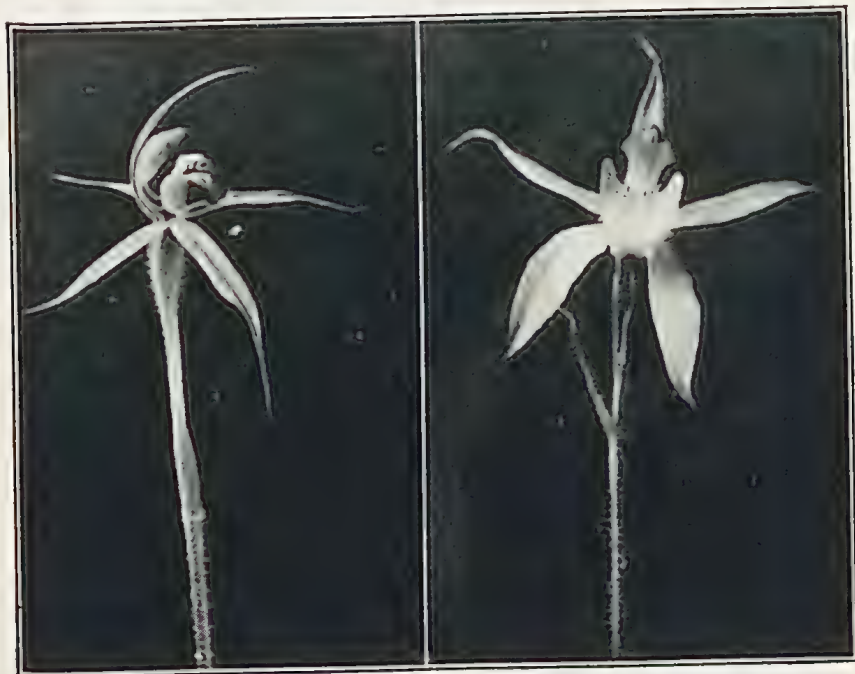
Slender, hairy, and in this State very short, not more than 6 inches in height. Leaf narrow lanceolate to oblong, very hairy. Flowers 1-2, medium size in this State, yellow, green and red-brown. Perianth segments red-brown down the centre. Sepals clavate (clubbed). Dorsal sepal incurved, tapering to a fine clavate point, lateral sepals dilated at base, afterwards constricted to fine clavate points. Labellum *oblong or broadly lanceolate*, on a movable claw undivided, red brown, erect in lower half and then recurved; margin entire; tip acute, but sometimes blunt; calli sessile, in 4 rows, rarely extending beyond the bend.

This is also a very rare species in this State. It is known from the Horsham district, and also from the S.W. It is dwarf in character, with quite a conspicuous



ERIOCHILUS AUTUMNALIS, R.Br.
"Parson's Bands."

ACIANTHUS EXSERTUS, R.Br.
"Mosquito-orchid."



CALADENIA CORDIFORMIS, Rogers.
"Small Spider-orchid."

C. PUMILA, Rogers.
"Dwarf Caladenia."



labellum. It is recorded also from South Australia. Flowers in October.

4. *C. RETICULATA*. Fitz. (netted, referring to the labellum). "Veined *Caladenia*."

Slender, upwards of a foot in height. Leaf very hairy, linear, channelled. Flowers large, 1-2, yellowish green and crimson. Sepals yellowish green, equal, with red central markings. Dorsal sepal erect, incurved, point filamentous and clavate; lateral ones spreading, thin, clavate. Petals lanceolate, darker, shorter, with crimson red centres. Labellum on movable claw, crimson or crimson and yellow, *ovate*; lower half erect with dentate margins; recurved part acute; calli in 4 rows, fleshy, crimson, clubbed; lamina smooth at tip, usually *with dark crimson veins*, which are occasionally inconspicuous.

This species, at first glance, is often taken for a colour variety of *C. Patersonii*, but the shape and veinings of the labellum differentiate it. It flowers usually in October, but in hill country is often found as late as New Year. The yellowish colorations are very distinct. It is recorded from the S.W., and S., and also from South Australia.

5. *C. CLAVIGERA*. A. Cunn. (clubbed). "Clubbed Spider-orchid."

Plant hairy, up to 9-10 inches high. Leaf solitary, linear-lanceolate. Stem hairy, with a narrow bract above the middle. Flower usually solitary, pale red and yellow; sepals similar to petals, but slightly longer, dorsal sepal usually recurved over the column; sepals terminating in distinctly clavate glandular points. Labellum with 4 rows of calli on the lower half; *ovate*, recurved, margins entire.

This plant is very commonly confused with *C. Patersonii*. The clubbed sepals, and the entire margins of labellum, distinguish it from that species. The confusion is very marked in the dried state of the plants, for the clubs, being brittle, very often break off quite freely. It is recorded only from the S., N.E., and E., but is possibly more widespread in Victoria than present records indicate. Recorded also from N.S. Wales and Tasmania. Flowers from Oct. to Dec.

6. *C. PATERSONII*. R.Br. (after Col. W. Paterson, Lt.-Governor of N.S. Wales and Tasmania). "Common Spider-orchid."

A species variable in height, but usually tall, upwards of 15 inches. Whole plant very hairy; leaf oblong to

linear-lanceolate. Flowers 1-3, white, pale yellow to dark red, usually large; perianth segments up to 6 inches long; spreading, often glandular, hairy at tips and on backs. Dorsal sepal often incurved over the column; sepals not clavate. Petals somewhat shorter, tapering to fine points. Labellum long, usually with crimson-purple tip and calli; ovate-lanceolate on short claw; basal half, erect, with acutely toothed margins, anterior portion recurved, usually purple or crimson, margins bluntly toothed or serrate with acute tip. Calli in 4 rows, clubbed, red coloured, hardly extending beyond the bend.

This is the common spider-orchid, known all over the Commonwealth. It frequently occurs in colonies, whose root-systems are unitedly connected underground. The flowers are larger and more conspicuous in West Australian specimens, the sepals frequently being 6 inches in length. It flowers from Sept. to Nov.

7. *C. PUMILA*. Rogers. (dwarfish). "Dwarf *Caladenia*."

Dwarf, 2 to 4 inches high, hairy. Leaf single, oblong-lanceolate, clasping at base. Stem short, stout. Flower solitary, white, relatively large. Sepals and petals wide, almost of equal length; dorsal sepal erect, often incurved. Labellum on short claw, white, with narrow pink margins; 3 lobed, ovate, blunt at apex; lower half erect, with entire margins; then recurved with distinctly serrate or crenulate margins; calli in 4-6 rows, pink, narrowly linear, ending near middle.

This large-flowered, white, dwarf species is recorded only from Bannockburn, where it was discovered by Miss B. Pilloud. It differs from *C. Patersonii* in its dwarf habit, and in the absence of filamentous points, and glandular hairs on the perianth segments. The blunt labellum, and its serrate, but not toothed edges, are conspicuous. The plant flowers in Sept.-Oct.

8. *C. DILATATA*. R.Br. (widened, referring to the labellum.) "Fringed Spider-orchid."

Usually robust, from 6 to 18 inches in height, hairy. Leaf solitary, hairy oblong to elliptical—sometimes linear-lanceolate. Flower solitary, rarely 2, sometimes 4 inches to 5 inches in diameter. Perianth segments all spreading except dorsal sepal, which is erect, dilated at base, thereafter, narrow, extending to a filiform point. Sepals usually, but not always, clavate, petals not clavate. Colour usually yellowish-green with red centre. Labellum purplish maroon, green and yellowish white, on a

very sensitive, movable claw, 3 lobed, recurved near middle; lateral lobes erect green, anterior margins very deeply serrated or fringed; middle lobe recurved, widely lanceolate, margins serrate, tip maroon; calli in 4 rows, usually prominent, those near claw thick, long, prominent and fleshy. Column much incurved, widely winged.

This well-known, abundant spider-orchid is found in every part of the State, occurring in all types of soil, from sea-coast sand, to clay silurian soils inland. It is usually at its best in dry ironstone country, where very large specimens are collected. One plant sent to me from Tooborac, had on the stem two large flowers, the sepals of which were over $2\frac{1}{2}$ inches in length. It is often found in considerable colonies, and, like *C. Patersonii*, the root systems often connect underground. The wide, *combed* *labellum* greenish and maroon are its distinguishing features. Occasionally albino forms are found, which may be white, cream-coloured, or greenish white. Sometimes these albinos show no colour, and sometimes the tip of the labellum is maroon crimson in colour. A distinct hybrid between this species and *C. Patersonii*, was recorded by J. Pescott from the Dandenong Ranges.

This species is recorded also from New South Wales, Tasmania, South and Western Australia. It flowers from September to November.

SECTION 2.

9. *C. FILAMENTOSA*. R.Br. (thread like, referring to the perianth segments.) "Tailed *Caladenia*."

Very slender, slightly hairy, 6 inches to 15 inches in height. Leaf solitary, very narrow linear, slightly hairy. Flowers 1 to 3, uniformly crimson in colour; perianth segments all broad at base, narrowing for three-fourths of their lengths to long and hairy filaments, often two or more inches long. Lateral sepals and petals spreading, dorsal sepal at first erect and then incurved over the column. Labellum more ovate than cordate, on a short claw; erect against the column, with shortly serrate margins; the frontal half recurved, tip entire and not acute; lamina with two closely set rows of calli, extending to the bend, sometimes light coloured with distinctly crimson veins. Column with wide wings above, less widely winged below.

A not common species, conspicuous for its long slight crimson perianth segments, which are hairy or glandular hairy. The species' name is very apt, for the seg-

ments are quite filamentous. *The 2 rows of calli* are its chief distinguishing feature.

Bentham, in *Flora Australiensis* records this as, "Stature and inflorescence of the typical *C. Patersonii*, and very nearly allied to it." But he records the two rows of calli. There is a crimson coloured form of *C. Patersonii* which might be confused with this species, for the perianth segments are often quite narrow. But it can easily be distinguished from the more robust species by its two rows of calli, and the absence of the two yellow calli at the base of the column. It is recorded from S., S.W., and E., and flowers in September. It also occurs in New South Wales, Tasmania, South and Western Australia.

Var. TENTACULATA. Tate. (tentacled, referring to long narrow feeler like perianth segments.)

Tate published this as a species, but there appears to be no difference between this and *C. filamentosa*, except in the colour. The variety is cream coloured, with a reddish maroon or reddish brown central stripe, becoming coloured at the tips. The labellum is cream-coloured, with very distinct divergent veins of the same colour as the central stripe.

This variety is rare in this State, being recorded chiefly from the N.W.

SECTION 3.

10. *C. MENZIESII*. R.Br. (after A. Menzies, a Surgeon-botanist). "Hare-orchid."

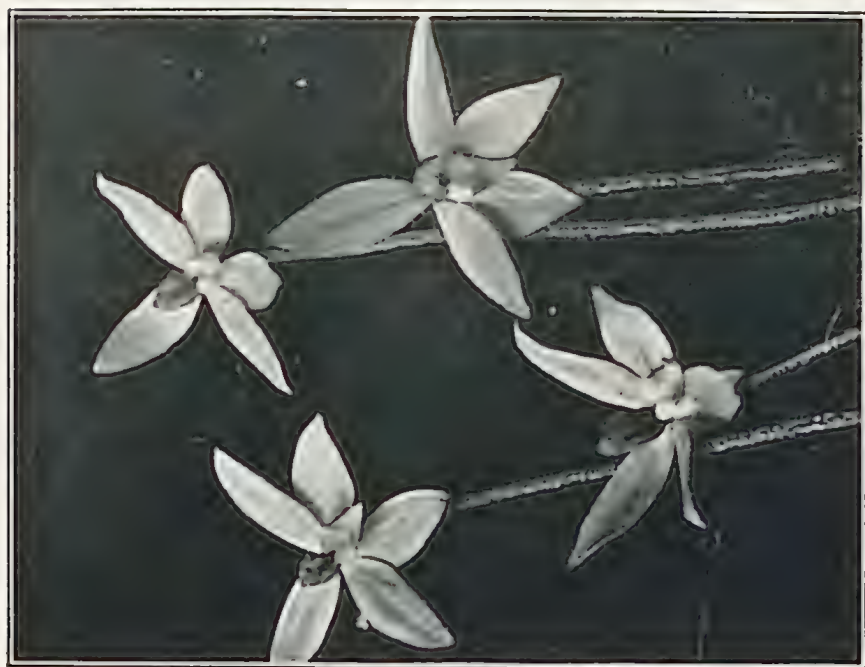
Generally slender, from 3 to 9 inches high. *Leaf bright green, glabrous*, ovate-lanceolate or broadly oblong-lanceolate. Flowers 1, rarely 2 or 3, white and pink, rarely albino. Dorsal sepal reddish, glandular hairy on back, spatulate-lanceolate, abruptly incurved over the anther, concave. Lateral sepals spreading, white, *crescentic*, wide in middle, contracted towards both ends, as long as dorsal sepal. *Petals carmine-red, often crimson-lake*, narrow linear in lower half, *clavate* and glandular in upper half, *stiffly erect*. Labellum on short claw, white with conspicuous transverse pink markings, orbicular-ovate, undivided, erect at base, tip white, blunt, recurved; margins entire; calli in 2 to 4 rows, shortly clavate, on slender pedicels, not extending to tip. Column erect, with transverse pink markings; widely or broadly winged.

The "Hare"-orchid is so named because of the two carmine petals which stand up erect like the ears of a hare.

Plate XVIII.



ORTHO CERAS STRICTUM, R.Br.,
Horned Orchid.



GLOSSODIA MAJOR, R.Br.,
Wax-lip Orchid.



The bright green glabrous green leaves are often found in forest country in very considerable colonies. Some years the colonies will not produce a flower, and in others flowers are abundant. It is generally a cool climate orchid. At Cheltenham I once collected several plants of this orchid having variegated foliage.

It is recorded from S., S.W., and E., and flowers in Sept.-Oct. It also occurs in Tasmania, South and West Australia.

SECTION 4.

11. C. LATIFOLIA. R.Br. (wide-leaved). "Pink Fairies."

Moderately robust, hairy, from 4 to 12 inches high. Leaf very hairy, oblong lanceolate, often 3 inches long. Flower 1, occasionally 2-3, pink, rarely white, fairly large. Perianth segments, lighter coloured on outside, glandular-hairy, spreading. Dorsal sepal erect, and not acute; lateral sepals free, or slightly adhering at base. Petals shorter, lanceolate, contracted at base. Labellum same colour as flower, sessile; deeply three lobed, lateral lobes and base erect, clasping the column, margins entire; middle lobe recurved, broadly lanceolate, fringed near base with a few marginal calli, or blunt teeth; calli of the disk or lamina linear-clavate, in two rows converging, or forming a semi-circle at or near the bend. Column erect, hairy on back, moderately winged throughout.

The "Pink Fairies" are frequently common at the seaside, often growing in pure sand, dashed by the sea-spray. Usually a seaside plant, it also occurs far inland. The bright pink flowers, with the very beautiful labellum, are conspicuous in September and October. The broad, large, green, hairy leaf is quite readily seen, growing flat on the ground.

Recorded from the N.W., S.W., S. and E., of Victoria, and also from all of the other States.

12. C. CARNEA. R.Br. (flesh coloured). "Pink Fingers."

Usually dwarf, slender, variable in height, from 2 inches to 10 inches. Leaf often very narrow linear, sometimes longer than the stem. Flowers 1 to 3, rarely 5, pink, sometimes white. Perianth segments dull green coloured on the outside, with glandular hairs, and sometimes pink striped; glabrous and pink inside. Tips often acute, usually blunt. Dorsal sepal erect or slightly incurved, linear; lateral sepals free, spreading, lanceolate. Petals

narrower than sepals, about same length. In some forms, especially in early flowers, all segments are equal. Labellum sessile, three divided, erect at base, recurved beyond the middle; lateral lobes broad, erect, margins entire; middle lobes lanceolate, dentate or fringed with calli; lamina with two rows of stalked, clubbed calli, often four rows at base not extending beyond the bend, *with transverse red linear bands*. Column incurved, narrowly winged, *with transverse linear red markings*.

This dainty spring orchid is very variable, sometimes the plants are quite tiny, others are tall and slender. The four petals and sepals are often spread out like the fingers of the hand, and thus the flowers are often known as "hands." The species is variable in colour as well. Frequent albino forms are seen, and occasionally the carmine markings on the labellum and column are absent. Very large forms, having quite wide sepals and petals, occasionally appear in New South Wales.

The species is widely distributed all over the State, flowering from July to October. It also occurs in all of the other States.

13. *C. PRAECOX*. Nicholls. (early).

The following description, abridged, is taken from the author's published record.

A graceful and rather slender species about 15 c.m. (approx. 6 inches) in height. Stem thickly covered with short hairs. Leaf very long, narrow-linear, sparsely hirsute. Flowers 1 to 3 on slender pedicels. Perianth segments falcate-lanceolate or elliptic-lanceolate, thickly covered with glandular hairs and glands. Lateral sepals and petals spreading narrow at the base. Dorsal sepal concave, incurved, forming a graceful hood. Labellum erect at base, recurving at tip. White with purple blotch at tip, hardly 3 lobed, markedly denticulate or fringed, except at the forward one-third. Lobes obtuse. At the tip, margins somewhat crisped or irregularly and shortly denticulated. Calli short, stout and clavate, in four somewhat irregular rows. Columns slender, irregularly spotted or blotched with red.

This newly-published species, which flowers in July, has long been regarded as an early form of *C. carnea*. Indeed, the differences are so slight, that, apart from variations of colour, and the fact that this form flowers early, the species might possibly be considered a variety of *carnea*. It is recorded only from the South, from districts near Melbourne.

THE PURALKA FLINT.

BY CHARLES BARRETT.

Found in association with remains of extinct Marsupials (including *Macropus anak* and *Sthenurus atlas*, *Perameles* sp., and *Phascalomys* sp.), the artefact known as the Puralka Flint is probably a relic of pre-historic man. It is undoubtedly a worked flint flake, with the bulb of percussion well defined and secondary chipping. And the fact that it was disinterred, with a large number of Post-Tertiary fossils, about 6 feet from the surface, is strong presumptive evidence of its antiquity: it could not, as some one has suggested, have fallen through a fissure into the shallow limestone cave at Forrestfield, Puralka, Victoria, where it was discovered by Mr. J. S. Lockie.

I visited the spot, in company with Mr. Lockie, and dug out more fossils, all referable to ex-



The Puralka Flint.

inct animals, notably giant kangaroos. The discoverer of the Puralka Flint considers that it is an ancient artefact, and not of comparatively recent origin. There is no reason why Australia should not have been the homeland of a vanished race—a prehistoric people. Indeed, evidence in support of the belief that the aborigines we know were preceded by men still more primitive, is accumulating. The Cohuna Skull is the most important relic yet discovered; other remains perhaps as ancient, have

been found, and other artefacts, doubtless contemporary with the Puralka Flint, are, I believe, preserved in private collections. There is need now for a survey of all the facts and theories, for a comparative study. Almost certainly further discoveries of importance will be made; discoveries that will either modify our views, or confirm them: the latter, I am hopeful, will be the case.

Ancient middens undoubtedly exist; though ethnologists may not agree as to their relative antiquity. Prehistory is a study in which imagination, controlled by scientific method, must mould conclusions. So an amateur even may attempt to picture the past: he is not

less likely to be wrong than the scientific pre-historians, since they differ widely from each other in their views.

The Puralka Flint is a large fragment of a neatly fashioned implement, which resembles an eolith, an artefact of the Palæolithic Industry. It has been examined by several students and collectors of Australian "Stone Age" implements, all of whom agree that it is an artefact, while not admitting its antiquity. It can be matched by modern worked flints. That is the reason advanced for refusal to accept the Puralka Flint as a relic of prehistoric man. This may be so; but how did it come to mingle with fossils, many of them embedded deep in Post-Tertiary limestone? There's the rub for doubters.

Keen search for artefacts, ancient or recent, should be made, in North-western and South-western Victoria especially. We may really be on the trail of ancient man in Australia. The Club's "Stone Age Evening" has stimulated interest in all that pertains to the aborigines. Let that interest be fostered. A visitor told me, after the meeting, that he knew of a cave in the Mount Gambier district, S.A., containing skeletons of aborigines—modern folks. And I have news of finds in other caves near, or across, the Victorian border. A rich harvest, perhaps, awaits earnest gleaners.

ORCHID SECTION MEETING.

Ten members attended the meeting of the Orchid Section of the Club, held in the National Herbarium on February 2, 1927. Mr. E. E. Pescott occupied the chair. After examination and discussion, it was decided to forward the proposed new species of *Pterostylis*, together with plate and description by Mr. W. H. Nicholls, to Dr. Rogers for confirmation. An article, entitled "The Vernaculars of Our Orchids"—a few suggestions by Messrs. A. B. Braine and W. H. Nicholls, was read and favourably commented on. The matter was referred to the Plant Names Committee. Questions of nomenclature were discussed, and recommendations made.

The Oriole (*Oriolus sagittatus*), like the Wattle-bird, evidently finds it expedient to change its habits to suit its environment. Orioles are numerous here at Tyers during the summer and autumn, but they rarely remain with us through the spring. It is, indeed, a common saying among us, "When the first fig colours the Orioles come." For a number of years the Orioles have appeared within one or two days of the first "colouring" of figs. Although we have never seen an Oriole feasting on vine-moth caterpillars, we have often found them very willing to enjoy the grapes. They are very fond of cockchafer beetles, which they catch during the summer evenings. Each insect captured is beaten against a branch or post, and the wing-cases (elytra) having been removed, is devoured.—J.G.

THE MITCHELL GORGE EXCURSION.

BY C. DALEY, B.A., F.L.S.

*(Read before the Field Naturalists' Club of Victoria,
January 17, 1927.)*

This year it was decided to break fresh ground by having the Christmas excursion at Deadcock Creek, contiguous to the Mitchell Gorge, about 160 miles from Melbourne. Accordingly a party of ten, in a motor-van, left Melbourne at 6 a.m., on December 27, travelling along the Prince's Highway, from which, at Fernbank, a divergence was made north-west, via the Dargo road.

Near Iguana Creek, Mr. Waller, a new member of the Club, showed the way to the camping-place, some miles distant on a quickly-rising road, by which, in about seven miles, we ascended 500 feet. Reaching camp at 8 p.m., the party settled down. Sleeping accommodation was found in a bark hut, kindly placed at our disposal by Mr. Waller, the motor-van, and Mr. V. Miller's tent.

At daybreak we were awakened by a hearty vociferous welcome from all the many district Kookaburras, perhaps in recognition of the Club's recent verdict in favour of the species generally! The camp was pitched on the rise of a hill commanding a good prospect on every side, 90 per cent of the original timber around being in dead or fallen trunks. We were about half-a-mile from the upper part of the creek, and two miles from the Mitchell Gorge. Eastward we could see Mounts Taylor and Look-out, near Bairnsdale; west of us, the peaks of Yellowman's Nob and Davy's Nob, off the Dargo track; southward, below the hills, was the plain country of Glenaladale and Fernbank; while to the north stretched generally the eastern ranges of the Mitchell watershed.

A walk of a mile and a-half over the dry, grassy hills, amid the gray trunks and fallen timber, brought us to an elevated hill, from the side of which we could overlook the Deadcock Gorge. A steep descent was here made, bringing us to a shelf of rock, about 20 feet high, across the creek, the cliffs rising on either side in hundreds of feet of tabular blocks of sandstone varied in colour; boulders, "confusedly hurled," occupying the creek's bed, amid which grew in great profusion a distinctive vegetation of a type foreign to the uplands, and characteristic of the rich jungle growth of Eastern Gippsland valleys; here, probably invasive or residual, but securely protected by the depth and narrowness of the gorge. The wearing away of the softer layers of rock overlaid by hard courses of sandstone or grit, has

left rock caverns or shelters invitingly attractive to the wanderer, and forming an ideal camping-place.

Firmly rooted in the gorge were Kanooka, *Tristania laurina* (in yellow bloom), *Pittosporum undulatum*, the Currajong, *Brachychiton populneus* (in bud and flower), the Mock Olive, *Notelæa longifolia*, the Blackwood, *A. melanoxyton*, and the Lilly-pilly, *Eugenia Smithii*, vigorously growing and raising their heads, some from 70 feet to 100 feet, at heights unknown in a less congenial environment. These were the chief trees, with shrubs of *Phebalium squamulosum*, in full flower; *Goodia lotifolia*, *Pimelea axiflora*, *Lomatia longifolia* (in bloom), *Senecio velleioides*, *Daviesia latifolia*, *Cassinia aculeata*, *Correa Lawrenciana* (in flower), *C. speciosa*, *Kunzea peduncularis*, and *Coprosma Billardieri* (in fruit). Among this vegetation, but chiefly overhead, jungle climbers of Eastern mountain valleys, "this way and that, in many a wild festoon ran riot." Here were the common Apple-berry, *Billardiera scandens*, the small Clematis, *C. microphylla*, *Calystegia sepia*, and the Twining Glycine, up to the cable-like trunks of the constricting Supplejack, *Rhipogonum album*, *Smilax australis*, Big-leaf Vine, *Sarcopetalum Harveyanum*, Wonga-vine, *Tecoma australis*, the Twining Silk-pod *Lyonsia straminea*, and others; some of which, with leafless stems, reached to the topmost branches of the trees before assuming foliage, or hung in looped swings or rope-like entanglements in or among the stately trees.

Owing to the dryness of the season, there was very little water in the creek, but sufficient moisture in the Gorge to give everything a verdurous appearance. The effect of encrusting mosses, ferns, and lichens on hoary trees and rock surfaces must be wonderfully enhanced in winter and spring, when water is flowing freely through the rocky gorge. From this sequestered spot a short walk brought us to the Mitchell River, the creek's mouth being practically hidden by the rocks and a thick tangle of scrub, chiefly Kanooka, which, with a low-branching habit and roots fantastically twisting about the boulders of sandstone or conglomerate, is the prevailing vegetation along the river-course, Musk, Lilly-pilly, Blackwood, *Callistemon Sieberi*, and the Manuka, *Leptospermum scoparium*, etc., being less common.

The Mitchell Gorge, extending past Cobannah Creek upwards, and down the stream for some miles, is wild and precipitous, cliffs rising on one side or the other, or

on both in nearly horizontal layers of irregularly jointed siliceous conglomerates, sandstones, shales, grits and felstones to varying heights, here about 600 feet, to the timbered hills above. The rock faces vary in colour to deep red, with weathered cave openings here and there, and occasional trees perched perilously on abrupt ledges yielding scanty foothold.

A fine current of clear water flows musically over rapids, there with a more placid surface, delightful for bathing and narrowing here and there with the density of the enclosing rock substance, never very wide in extent, the lowering crags occasionally being relieved by dense vegetation at their base, where a bank of detritus or a projecting talus of fallen rocks, with silt accumulations, has been formed, giving a foothold above the water-level for plant growth.

According to the survey made 50 years ago by the late Dr. Howitt, the geological formation of this area is that of the Iguana Creek beds of the Upper Devonian period, marked broadly by thick layers of coarse siliceous conglomerates, grits, sandstones, and felstones hard and compact in character, the softer shales often wearing out into cave holes or recesses. Dykes of basic igneous rocks are occasionally intrusive in the stratified layers, altering their texture.

A pleasant day was spent here at the Mitchell. A very pleasing feature of the river is the unceasing musical calling of a large colony of Bell-miners. No aquatic birds were seen, except a lonely Black Duck; but the Sacred Kingfisher and the Azure Kingfisher were noticed.

On Thursday we essayed Deadcock Creek from opposite the camp, passing numberless rabbits on the way. The creek had intermittent pools of water, discoloured by vegetable matter, and was difficult to follow, owing to the close nature of the scrub, consisting of *Phebalium*, *Tristania*, *Daviesia*, *Hymenanthera*, *Helichrysum*, *Calistemon*, *Coprosma*, tussock-grass and creepers, along its course. The ferns were *Adiantum*, *Blechnum*, etc., and occasionally an *Alsophila australis*. After travelling some time under difficult conditions, we left the creek, and went over the hills to the Mitchell.

Entering the Deadcock Gorge by the steep valley at the first cave-formation, before-mentioned, we went up the rocky bed in the cool shade of its characteristic vegetation, to the second rock-shelf, about 30 feet in height, right across the gorge. A dark pool in front of it re-

flected verdure and cliff overhead. This imposing shelf of jointed layers of sandstone overlies the softer and redder shale beneath, which has been washed out by water action, leaving a cave about 150 feet in length, and extending from 30 feet to 40 feet from the front. At the back is a layer of fine, white, and dry sand. Water percolating slowly from above through strata evidently containing lime, holds it in solution, and by slow deposition forms stalactites beneath and at the edge of the roof, and stalagmites on the floor of the cave. On one side of the cave a supporting limestone pillar, or buttress, thus formed is specially noticeable. It was interesting to see, at some spots where the steady drip of water occurs, that stray fronds and stems of bracken within reach of the spray were coated with a layer of lime, giving a frosted appearance to the leaflets. (See *Naturalist*, Vol. XXXVII., p. 35.) The sides of the enclosing cliffs rise up 400 feet or 500 feet, forming, with the high rock shelf, a perfect *cul-de-sac*, from which there is no outlet upstream without climbing a tree or improvising a ladder, such as that of Howitt's blacks, 50 years ago. (See *Naturalist*, Vol. xl., pp. 77-9). Above the mantling shelf is a succession of receding ledges of rock, like broad pavement steps, and the creek gradually widening and rising fast becomes much less precipitous, and opens out into scrub, and then forest country.

The towering cliffs, the beautiful, lofty trees, the striking features of the cave, the "Nargun's Den," the twisting lianas, the attractive beauty of the setting, with its strangeness and harmonious blending of color and form, compose a picture that can only be imperfectly described, but will long live in memory. It is unique, a place apart, a restful retreat, secure in its situation from storm or devastating fire affecting the hills above. There is no evidence of fire having invaded the Gorge from the fire-swept surfaces overhead. The Gorge provides refreshing coolness, shade and water, so that birds come there from the heat of the upper air. Bell-miners haunt its entrance, Bronze-wings its rock-bound pools. The Wonga Pigeon rises in whirring flight, Lyre-birds frequent its covers, Gang-gang Cockatoos feed on the tree-tops; and smaller birds rejoice in its sheltering groves.

Next day, crossing the upper scrubby part of Dead-cock Creek, we went north-east over a steep ridge, into Bull Creek, and under the shadow of the umbrageous

trees followed it down to the Mitchell river. Here again, hemmed in by sheer towering rock-faces, the vegetation is most luxuriant and distinctive, and this gorge, similar in features, is scarcely inferior to the other, evoking our warm admiration and delight. It, too, has its steep declivities, stalactitic processes, calm pools, and the combination of rugged grandeur, softened by luxuriant variety of plant life.

These gorges, aloof from their surroundings, are natural sanctuaries worthy of the closest preservation. In them we get the furthest western limits in Gippsland of such north-eastern plants as the Currajong, the Kanooka, and the lianas of the East, in robustness of growth. One *Tristania*, with gnarled trunk, at 3 feet from the ground, was 16 feet in girth, and about 70 feet in height. Above the gorges on the ranges the vegetation is characterless, Stringy-bark, Red Box, Common Peppermint being the chief Eucalypts. *Xanthorrhœa hastilis*, the Spear-grass tree, was abundant. Eucalypts hardly penetrate into the gorges. Birds were numerous, tuneful, and objects of great interest, 48 species being noted.

It was amid the musically-swelling tintinnabulation of the Bell-miners and the rich full-throated song of the Grey Shrike-thrush, that we made our last ascent up the steep hill overlooking the Mitchell; while around our camp birds were always present—Yellow-tailed Thornbills chirping in a large fallen limb adjacent to the tent; Wood-Swallows assembling on dead trees, Wrens, Finches and tree-creepers close at hand. At early morn we could hear young Kookaburras and Magpies being fed by parent birds; Parrots, Magpie-larks, and other birds joined in the musical medley. Messrs. Hughes and Miller located a family of three Frogmouths at a short distance from the camp, and nests of several birds were seen. No Sparrows, Starlings, or Blackbirds were in the vicinity. Of other fauna, Wombats and Foxes have good cover in the gorges, and Wallabies frequent the timbered hill slopes.

On Monday, January 9, the party left camp at 6 a.m., and without incident reached Melbourne at 6.30 p.m., fully satisfied with their outing. Their best thanks are due to the Messrs. Waller and Mr. and Mrs. Du Ve, for kindly assistance and guidance.

At the week-end we were glad to welcome a fellow-member, Mr. E. Cox, of Bairnsdale, who, through illness, at the last moment had been unable to join the party. The comfort and convenience of the party were assured

by the appointment of our versatile member, Mr. V. Miller, as quartermaster and first chef, his services being much appreciated.

In regard to insects, Mr. W. H. Rogers reports:—"The trees round the camp being nearly all ringed, and the country having been swept by fire last year, the locality was not very favourable for insect collecting. Five species of butterflies were noted, and several handsome blue-and-black dragonflies were taken in the Mitchell Valley. The larvae of the Imperial Blue butterfly were found in considerable numbers, and specimens were successfully bred therefrom."

EXCURSION TO BOTANICAL GARDENS.

The pleasant change in temperature experienced on January 15, no doubt accounted for the large number of members who met at the Botanical Gardens to add to their knowledge of aquatic zoology. Although naturalists have been collecting in the lakes in the Gardens for many years, there is always something interesting to find there—and the recent excursion was no exception to the rule. Perhaps the most interested members of the party were the juniors, some of whom were seeing pond animals for the first time, and it was delightful to see the interest they took in them. The intelligent questions asked as to habits, etc., enabled the leader to give little talks on the life-histories of dragon-flies, May-flies, water boatmen, and other insects, as the net brought specimens of them to view. One child was particularly delighted when she captured a female *Xiphocaris*, carrying a load of eggs, and did her best to remember its name.

As usual at this time of the year, the lake was filled with *Volvox*. These beautiful crystal spheres, dotted with emerald green, were much admired when viewed through a pocket lens. As usual, also, when *Volvox* is much in evidence, the parasitic rotifers, *Proales*, were very numerous—fully 10 per cent. of the *Volvox* colonies that I examined, contained one or more of the rotifers or their eggs. *Euchlanis* sp., *Asplanchna* sp., *Rotifer vulgaris*, and splendid clusters of *Lacinularia elliptica*, were the other rotifers noted. Entomostraca were not numerous, *Boeckella symmetrica* and *Cyclops albidus* were the only copepods identified, and *Simosa gibbosus* *Mionadaphnia* sp., and *Pleuroxis* sp., were the only Cladocera. *Plumatella repens* was found on submerged bamboo canes.

The following specimens have been identified:—

Crustacea—Caridea:—*Xiphocaris compressa*, *Xiphocaris zoaea*.

Copepods:—*Boeckella symmetrica*, *Cyclops albidus*.

Cladocera:—*Simosa gibbosus*, *Pleuroxis* sp., *Mionadaphnia* sp.

Polyzoa:—*Plumatella repens*.

Rotifera:—*Euchlanis* sp., *Asplanchna* sp., *Rotifer vulgaris*,¹ *Lacinularia elliptica*, *Proales parasitica*.

Insect larvae:—May-fly, Caddis-fly, Dragon-fly, *Chironomus*, *Ceratopogon*.

Protozon:—*Volvox*, *aureus*, *vorticella* spp., *Epistylus*, *Stentor*, *Thuricola*.

Aquatic Botany:—*Spirogyra*, *Azolla*, *Wolffia*, *Vallisneria spiralis*, *Elodia canadensis*.

NOTES ON THE COLEOPTERA OF NORTH-
WESTERN VICTORIA.

Part XIV.

BY J. C. GOUDIE.

CHRYSOMELIDÆ.

This family, abundantly represented in Australia, comprises a large division of Coleoptera, over 900 species being recorded in Master's Catalogue. They are leaf-eating beetles of small size, rarely exceeding half an inch in length. They are diurnal in habit, feeding chiefly on the tender foliage of young eucalypts and wattles.

CRYPTOCEPHALIDES.

6273. *Lachnabothra wilsoni*, Baly.6298. *Elaphodes vulpinus*, Suffr.*Ditropidus apicipennis*, Lea.6320. *Ditropidus concolor*, Snd.6324. *Ditropidus cuneatus*, Chp.6326. *Ditropidus davisii*, Snd.*Ditropidus frater*, Lea.6385. *Ditropidus splendidus*, Chp.

The genus *Ditropidus* contains a large number of smooth, shining beetles, of small size. They feed on acacias, appearing sometimes in considerable numbers.

Coenobius binotatus, Lea.6412. *Cadmus crucicollis*, Boisd.6414. *Cadmus excrementarius*, Suffr.6418. *Cadmus histrionychus*, Chp.6426. *Cadmus ornatus*, Chp.6431. *Cadmus rugicollis*, Gray.

The species of *Cadmus* are about 1-3rd of an inch in length, and rather stoutly built.

6413. *Brachycaulus ferrugineus*, Fairm. Light brown, with darker markings, "prothorax with three velvety-black spots, surrounded by pale rings, one on disc, and one on each side."

6460. *Cryptocephalus carnifex*, Suffr. Bright red, underside and legs black; may be a var. of *haematodes*, Boisd., but if so, deserves a name.

6461. *Cryptocephalus castus*, Suffr.

Cryptocephalus comptus, Lea. Dark red, with base, suture and broad preapical band blue.

6473. *Cryptocephalus erosus*, Snd. Yellow; front of prothorax marked with black, elytra thickly speckled with black spots.

Cryptocephalus metallicus, Lea. Uniform dark metallic bronze-green.

Cryptocephalus scabiosus, Lea.

6474. *Cryptocephalus eruditus*, Baly. Proth red, elytra blue, with a V-shaped red mark on suture.

6488. *Cryptocephalus pæcilodermus*, Chp. Yellow, proth and elytra strongly and closely punctate.

Schizosternus. One species, undetermined.

6523. *Loxopleurus atramentarius*, Chp. Black.

6524. *Loxopleurus auriculatus*, Suffr. Black, sub-humeral lobes of elytra distinctly marked yellow or white.

Loxopleurus pollux, Lea. Black, prothorax red.

SUB-FAMILY EUMOLPIDES.

Represented in this district by the genera *Tomyris*, *Rhyparida*, *Edusa*, *Cleptor* and *Rhinobolus*. These comprise a number of very handsome little beetles; brilliant metallic colours of green, blue, or coppery-red prevail among them. Some of the species occur in large numbers during the hot months, feeding on the tender shoots of eucalypts.

Tomyris aureoviridis, Lea.

Tomyris illaetabilis, Lea.

Tomyris laeta, Blackb.

Tomyris obscura, Blackb.

Tomyris rasa, Blackb.

Tomyris soror, Lea.

Tomyris tepperi, Lea.

Tomyris viridula, Er.

Rhyparida vagans, Lea.

Edusa distincta, Blackb.

Edusa hirta, Blackb.

Edusa multicolor, Lea.

6619. *Edusa suturalis*, Chp.

Cleptor goudiei, Lea.

Rhinobolus nitidus, Blackb.

SUR-FAMILY CHRYSOMELIDES.

Chalcolampra hursti, Blackb. This species is usually met with under stones or logs; it is shining bronze-black.

Calomela caelestis, Lea. Beautiful dark-blue, shining; legs and flight-wings red. Found chiefly on *Acacia Oswaldi*.

6702. *Calomela ioptera*, Baly. Prothorax red, elytra purple, with blue or green shades, strongly punctate; taken on acacias.

GENUS PAROPSIS.

This genus contains a greater number of species than any other genus of Australian coleoptera. They are robust, very convex, smooth beetles of rounded oval form, and are found usually clinging to the leaves of low bushes, the shoots or suckers of eucalypts are especially favoured by them. Many of the species are beautifully coloured, but often the bright colours fade entirely after death, becoming a dull yellow or brown. Others are adorned with spots, bars or stripes of fixed colours. The larvae, which feed on the gum-leaves, are short, stout, grub-like creatures; they cluster together when young, afterwards separating.

6736. *Paropsis aenipennis*, Chp. Underside, parts of head, and margins of prothorax castaneous, remainder dark olive green. Quarter inch long. Taken on Myall, near Ultima.

6757. *Paropsis beata*, Newm. A smooth, shining black species 7-16th inch in length, having the margins of prothorax and elytra and three spots on each elytron red.

Paropsis confusa, Blackb.

Paropsis dryope, Blackb. One of our smallest kinds, measuring only $\frac{1}{8}$ inch. Testaceous, with very variable black markings.

6836. *Paropsis intacta*, Newm. Yellowish-brown, striated, margins of elytra paler. Head and prothorax spotted black.

Paropsis mystica, Blackb. Brown, the elytra with two transverse yellow markings on each; about the size of *intacta*.

6880. *Paropsis nigrovittata*, Chp. An almost hemispherical species, $\frac{3}{8}$ inch in length; Testaceous, elytra each with 10 longitudinal black lines.

6890. *Paropsis obsoleta*, Oliv. Reddish-yellow, elytra with three transverse rows of indistinct dark spots. 5-16th inch in length.

6930. *Paropsis roseola*, Baly.

6932. *Paropsis rubiginosa*, Chp. Green (some specimens turn red after death), elytra, each having 6 or 7 black spots. Length, 3-16th inch. This species, as well as *Paropsis dryope*, is found only on *Acacia hakeoides*.

6764. *Paropsis sublimbata*, Chp. Yellowish-brown, $\frac{3}{8}$ inch in length. A dark blotch near outer margins of prothorax. Elytra with three stripes on each, besides the suture, black.

6990 *Paropsis variolosa*, Marsh. The largest Mallee species, being nearly $\frac{5}{8}$ inch in length. Yellow, the elytra wrinkled and strongly punctate.

6988. *Paropsis variabilis*, Chp. Light yellow, $\frac{3}{8}$ inch; parts of head, and a large blotch on shoulders of elytra, black. Elytra finely but distinctly striate-punctate.

In addition to the above, about nine species, which have not been identified, occur

HALTICIDES.

7023. *Arsipoda rugulosa*, Baly.

Arsipoda variegata, Blackb.

Haltica pagana, Blackb.

Hyphaltica mediocris, Blackb.

Plectroscelis tumbyensis, Blackb.

The Halticides have the hind pair of legs much longer than the others, and the femora enlarged; this enables them to jump with great agility. *H. Pagana* is dark shining blue; at Nyah, on the Murray, in January, 1926, it occurred in swarms, feeding on a plant growing in the lagoons.

GALERUCIDES.

7076. *Aulacophora hilaris*, Boisd. Known as the "Banded Pumpkin Beetle," it is a pest to gardeners, as it feeds on the leaves of melons, pumpkins, etc. During some seasons it has appeared in large numbers, causing great damage, not only to the melon tribe, but to other plants as well.

Adimonia elegans, Blackb. A rather handsome and rare species, about 1-3rd inch in length. Taken on the foliage of the Quondong.

Ellopiia sloanei, Blackb. An uncommon beetle, occurring among grass in swampy places.

Monolepta divisa, Blackb.

Monolepta modesta, Blackb.

Monolepta modesta, Blackb.; var. *angulata*, Bl.

Monolepta nigricornis, Blackb.

Small beetles having fairly long slender antennæ.

Monolepta nigricornis is black, with greenish-yellow prothorax.

Monolepta modesta has the prothorax red. *Monolepta divisa* has the head, prothorax and about half the basal part of elytra yellow, the rest black.



INQUILINES FROM NEW SOUTH WALES.

Pheidoliphila minuta, Lea. This most interesting little beetle, an inquiline that lives with ants of the genus *Pheidole*, was first discovered by the late Mr. F. P. Spry, at Ferntree Gully, and has since been taken at Healesville, Beaconsfield, and in one or two other localities. Mr. Chas. Barrett recently brought back from Mount Victoria, in the Blue Mountains, N.S.W., some inquilines, among which I have identified this species, hitherto recorded only for Victoria. The specimen is a little smaller than Victorian examples before me, and is slightly more attenuated behind, but nevertheless agrees well with *P. minuta*.

Another interesting inquiline, also collected by Mr. Barrett at the same locality, is a form of *Chlamydopsis epipleuralis*, Lea. It forms a connecting link between typical *apipleuralis* and *C. sculptus*, Oke. It has the sculpture of *sculptus*, but the shape of the prothorax is as in *epipleuralis*. In my opinion, this indicates that *sculptus* is a var. only of *epipleuralis*, and not a distinct species.—F. ERASMUS WILSON.

THE SHE-OAK SCALE.

Numerous specimens of the scale, *Frenchia casuarina*, were found on Casuarina trees at Yan Yean. Mr. C. French, Sen., who first brought it under notice, states that the She-oak scale is probably the most remarkable gall-forming insect in the world. It is born with six legs, two compound eyes, a pair of antennae and mouth-parts. Moving about freely, it attacks the bark of Casuarina trees, and forms a gall in which it is enclosed. A remarkable change then takes place. The eyes, legs, antennae, and mouth-parts disappear, and the shape of the body is entirely altered; it appears something like an inverted mushroom, with the stalk or tail projecting into the cylindrical tube-scale. At this stage the insect appears to absorb nourishment through the skin. It is in this stage also that the active six-legged young are produced. All the specimens discovered are females, the male, at the time the above description was made by Maskell, being entirely unknown.—A. E. RODDA.

BI-PINNATE FORM OF LOMARIA DISCOLOR.

In the January number of the *Naturalist* are some remarks regarding the bi-pinnate form of *Lomaria discolor*. It may be of interest to the Club to know that this form was first discovered by the late Mr. D. Boyle (I think in 1858), in the Dandenong Ranges. The second specimens were found by the late Mr. Taylor and myself at Macedon. Many years ago, I found more than 50 fine specimens, about 10 miles west of Drouin; many of these were presented by me to the Botanic Gardens, and other places. Some 10 years ago, the late Mr. R. Cheeseman raised a large number of specimens of this fern from spores obtained near Beaconsfield, where it was at one time fairly plentiful. I have seen dozens growing in many parts of Gippsland, and elsewhere. I note the generic change to *Blechnum*, and sometimes wonder whether finality in nomenclature will ever eventuate.—C. FRENCH. Senr.

TRILLERS IN TYERS DISTRICT.

I have not, until this year, either seen or heard Trillers (*Campophago tricolor*) in Tyers district, yet at present (mid-January) they are fairly common. Three pairs are usually near our garden, and at least one nested in the orchard. It seems probable that we owe the honour of this visit to the unusual abundance of caterpillars of various species of moths, but chiefly, apparently, *Teia anartoides*. Caterpillars appear to constitute their sole diet, and on them also the young birds are fed. Not only are the Trillers, both male and female, graceful and beautiful, but their song adds a new delight to the music of the garden. Even as they were well named Caterpillar-eaters, so are they now as truly, and much more euphoniously, known as Trillers. The young birds are very fearless. Near the end of December, two children brought one to me, thinking it was hurt, as it remained so long beside them on the verandah, where they were playing. Carrying it to a cluster of shrubs where Trillers could often be seen, I opened my hand, and after a moment the little bird flew strongly to the top of an apple tree some yards away. Its mother appeared immediately, and we were able to watch her feeding it with caterpillars while we stood at the base of the tree.—J.G.

A GOOD WORD FOR WATTLE-BIRDS.

We found the notes on Red Wattle-birds (*Anthochaera carunculata*), at Sperm Whale Head (*Naturalist*, Dec., 1926), very interesting, especially as their ways, here, are quite different. As at Sperm Whale Head, we find these birds common only in the autumn, when apples and pears are ripening, although a few remain with us throughout the year, yet they never seem to be very pugnacious, and although a pair has been about our house since early spring, we have noticed the number of species in the orchard and garden (about an acre of ground) increase rather than decrease. I see about 20 species in that area every day.

On December 30 a Wattle-bird and a White-eared Honeyeater (*Meliphaga leucotis*) were feeding together, on nectar, in a flowering Fuchsia, while two species of Thornbills, Spinebills, Trillers, and a family of Blue Wrens, were present a few yards away. Daily, we see Black-faced Cuckoo-shrikes, Friar Birds and Kookaburras, all careless of the presence of the Wattle-birds, though the Kookaburras are always hunted away by a pair of Black-and-White Fantails, which are now (January 10), guarding their second brood.

The presence of the Wattle-birds has not prevented Trillers, Grey Fantails, Black-and-White Fantails, Wood-swallows, and Pardolotes from nesting about the house this season; and we are sure, though we have not discovered them, that Blue Wrens and Spinebills also built their homes here. I have never seen Wattle-birds about my food-tray, but have lately had to stop putting food there, as it attracted so many sparrows. Most of the smaller birds seem better pleased by flowering shrubs, which provide them with honey and insects, and a shallow dish kept always filled with water, in a shady corner. It is possible that honey-eaters would be more pugnacious in comparatively open, heathy and Banksia country than here, where tall Eucalypts, dense Lightwoods and English shade-trees, as well as fruit trees and flowering shrubs, native and exotic, provide close cover. Certainly the difference in the habits of Wattle-birds in two localities is very interesting.—(MISS) J. GALBRAITH.

Field Naturalists' Club of Victoria

OFFICE-BEARERS, 1926-1927.

President: MR. E. E. PESCOTT, F.L.S., 35 Seymour Av., Camberwell.
(Tel. Canterbury 2751.)

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MR. P. R. H. ST. JOHN.

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F. CHAPMAN, A.L.S.; C. DALEY, B.A., F.L.S.; J. A. KERSHAW, and
V. Miller.

EXCURSIONS.

SATURDAY, FEBRUARY 12th.—Botanic Gardens. Object: Links with the Past. Leader: Mr. F. Chapman, A.L.S. Meet at Office Gate at 2.30 p.m.

SATURDAY, FEBRUARY 19th.—Eltham. Object: Butterflies. Leader: Mr. C. H. Borch. Meet at Prince's Bridge Station in time for 1.20 p.m. train.

SATURDAY, FEBRUARY 26th.—Woori Yallock. Object: Fossils. Leaders: Messrs. H. R. Syme and F. Chapman, A.L.S. Meet at Flinders Street Station in time for 8.21 a.m. train. Lunch to be taken.

SATURDAY, MARCH 12th.—Zoological Gardens. Object: Zoology. Leader: Mr. A. Wilkie. Meet at Main Gates at 2.30 p.m.

EASTER EXCURSION, APRIL 15th to 19th.—Toolangi. Object: General. Leader: Mr. A. E. Keep.

NOTE.—As it is proposed to publish a list of members in the April issue of the *Naturalist*, members are requested to notify the Hon. Secretary as early as possible of any changes of address, and particulars of the branch of natural history in which they are most interested.

Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 14th MARCH, 1927.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS

PROPOSER:

SECONDER:

Rev. Robt. B. McConchie,
Methodist Parsonage,
Jupiter St., Caulfield.

Mr. F. Chapman,
A.L.S.

Mr. L. L. Hodgson

Mr. J. Clark, F.L.S.,
National Museum,
Melbourne.

Mr. F. E. Wilson
F.E.S.

Mr. C. Barrett
C.M.Z.S.

Miss Mary Vinnicombe,
98 Wright St.,
Middle Park.

Mrs. M. L. Thompson.

Mr. H. B. Williams,
F.I.S.

AS ASSOCIATE MEMBER:

Master Howard M. Bain-
bridge,
University, Carlton.

Mrs. L. Edmond-
son.

Mr. A. G. Hooke.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural specimens, should exhibit them at the Club's meetings, and, if possible, make a few remarks concerning them; also furnish the Hon. Secretary with written particulars for record in the Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

6. Reptile Evening.

Lecturettes will be given by Mr. J. A. Kershaw, F.E.S., and Mr. H. W. Davey, F.E.S., on Australian Snakes and Lizards. (Illustrated by lantern slides).

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a short account thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

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No. 519.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, February 14th, 1927. The President, Mr. E. E. Pescott, F.L.S., occupied the chair, and about 100 members and friends were present.

CORRESPONDENCE.

From Mrs. F. Wisewould, thanking the Club for its expression of sympathy on the death of her husband.

REPORTS.

Reports of Excursions were given as follow:—Warburton, Mr. A. E. Rodda; Botanic Gardens, Mr. F. Chapman, A.L.S.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Mr. W. G. Chisholm, 198 Albert-street, East Melbourne; Mr. H. Howard, "Quendon," Chapel-street, St. Kilda; Mr. W. H. McMillan, 21 Weigall-street, South Yarra; and Mr. John Mason, 3 Rowena-parade, Richmond. As Country Member:—Dr. R. S. Rogers, F.L.S., 118 Hutt-street, Adelaide, S.A.

GENERAL.

Mr. A. D. Hardy moved: "That the Secretary for Lands be written to asking that the Crown lands on Sperm Whale Head, referred to in previous correspondence, be declared a National Park, and that a committee of management be appointed." The motion was seconded by Mr. H. B. Williamson, and carried unanimously.

The President stated that the Committee felt that the time was opportune to introduce a new Club badge, and that a sub-committee had been appointed to make a recommendation as to a suitable form and design.

Mr. A. D. Hardy moved: "That the Club direct the attention of the Chief Secretary to the danger to human life, and to the destruction of native birds and animals occasioned by the use of the pea rifle, and that he be asked to prohibit altogether the sale and use of this weapon."

Mr. C. French, Jr., seconded the motion, which was supported by Messrs. A. J. Tadgell and W. Ingram, and carried unanimously.

LECTURETTES, ETC.

Mr. J. Searle read a short paper descriptive of the various forms of aquatic life, from the Protozoa

(*Amœbæ*, etc.) to the higher forms (Frogs, etc.). A special display of microscopical slides and animal life in small glass aquaria, in the Upper Hall, greatly interested members and visitors.

EXHIBITS.

By Mr. E. E. Pescott, F.L.S.: Flowering specimen of *Dipsacus fullonum*, L., Fuller's Teasel, an introduced weed, the hooked "teasels" of which are used for putting a nap on cloth. *Leptospermum scoparium*, R. and G. Forster, var. *magna-rosea*, cultivated.

By Mr. W. H. Ingram: Pressed specimens of seaweeds, collected at Beaumaris.

By Mrs. Hodgson, on behalf of Miss Amy Fuller: Flowers from Mt. Victoria, Blue Mountains, N.S.W.

By Mr. C. H. Borch: Butterflies and moths, collected during A.N.A. week-end, at Warburton, and including *Oreixenica correa* and *Heteronympha solandri*, usually found at altitudes from 4,000 ft. upwards. Case showing larva and moth of *Chelepteryx collesi*, taken at Edithvale.

By Mr. A. J. Tadgell: Dried specimens of:—*Muehlenbeckia Cunninghamii*, F.v.M., Tangled Lignum, from Sunbury; *Blechnum discolor* (Forst), Keys, Fishbone Fern, with rachis divided twice, and ends of pinnae four times, near Wandin; *Polygonum minus*, Hudson, Slender Knotweed, showing very small flowering specimen; *Alternanthera triandra*, Lam., Joyweed; *Erythraea Centaurium*, Pers., Common Centaury, introduced alien, hitherto often placed under *E. australis*, R.Br.

By Jas. A. Kershaw, for National Museum: Collection of Water Insects of the orders *Coleoptera*, *Hemiptera*, *Neuroptera*, etc.; also unusually large examples of the Fresh-water sponge, *Ephydatia fluviatilis*, from a dam at Doncaster, collected by Mr. A. O. Thiele, in June, 1921.

ALTERATION OF CLUB RULES.

Notice is hereby given that a Special Meeting of the members of the Club will be held on Monday evening, March 14th, at 7.45 p.m., to consider alterations of the Rules as under:—

That Rule 4 be altered to read—"The Club shall consist of—(a) honorary, (b) ordinary, (c) country, (d) life, and (e) associate members.

That in clause (b) the words, "Ordinary members may become life members on payment of twenty guineas in one sum" be deleted.

That in clause (c) the rate of subscription be altered from "twelve shillings and sixpence" to "fifteen shillings," and that the following

words be added—"Provided that, where more than one member of a household shall become members of the Club, the additional member or members may pay an annual subscription of seven shillings and sixpence, which shall not entitle them to the Club's journal."

That the following be substituted for clause (d)—"Ordinary members may become life members on payment of twenty guineas in one sum."

That the present clause (d) be transferred to clause (e), except that the words "two shillings and sixpence" be altered to "five shillings" (in respect of additional payment for the Club's journal).

That clause (e) relating to Junior members as at present appearing in the rules be deleted.

That Rule 6 be altered to read, "Candidates for admission must be proposed and seconded by two members at one meeting, and elected or rejected by a show of hands at the ensuing meeting, one dissentient in ten to exclude; provided that, any member or members may demand that the candidates be balloted for, in which case a ballot shall be conducted, one black ball in ten to exclude; but no person who has been elected shall be entitled to the privileges of a member until his or her subscription shall have been paid, or while his or her subscription is in arrears."

That in Rule 11, the words "with the retiring President" be inserted between the words "who" and "shall."

That in Rule 16 the words, "All cheques shall be signed by the Treasurer and Secretary" be added.

COCKATOOS' AUTUMN FARE.

In the early days of the Morse's Creek goldfield, many miners, who held more than the recognised acre of land, planted hedges of white hawthorn, to take the place eventually of fences that in time would fall in decay. To-day some of those hedges are from 30 to 40 feet in height, and intermingled, as they are, with blackberry brakes, they form an impenetrable barrier, as well as a silent testimony to the foresight of the miners. These natural fences, when the berries are ripening, lure Gang Gang Cockatoos.

Every year flocks of Gang Gangs arrive, and strip every hedge of its jewels—red berries. Near my residence is a hedge about 300 yards in length, and I have made a point of studying the birds, and their methods of attacking the berries. They arrive with unfailing regularity, about the end of February or the beginning of March. I have noticed that generally one pair appears first; as the days pass, so the numbers increase.

At dawn, the call-notes of one or two birds are an indication that the flock is on the move, and soon the branches are bending beneath the weight of eager berry-eaters. The Gang Gangs keep up a constant chatter while cracking the kernels. About 8 o'clock they begin to return to the mountains, where they remain until evening, when again the hedges are visited. The birds are very tame, and take no notice of persons walking along the hedgerows. As one hedge is cleaned up, the flock moves off to another, and so on, day by day, until every hedge has been stripped clean of berries. The flocks disappear, and are not seen again in the district until early autumn in the following year. The interesting point is, where do they go, and how do they know when the hawthorn fruit is ripening?—W. H. GOLDSWORTHY.

AQUATIC LIFE EVENING.

When asked to arrange an "Aquatic Evening," for the February meeting of our Club, I thought it would be more interesting and instructive to visitors if, instead of providing haphazard exhibits, the specimens were arranged systematically, so that the relationship between them could be easily traced.

The exhibits begin with living specimens of *amoeba*, followed by ciliated forms, such as *paramoecium*, which are found in water containing decaying substances, sometimes in such numbers as to give the water a milky appearance; next came single-celled animals living in colonies—such as *Volvox*, beautiful crystal spheres studded with green, so plentiful just now (February) in the Botanic Gardens lake. These may be looked upon as a link between the single celled Protozoa and the many-celled animals, the Metazoa.

In the next group, *Porifera*, the sponges, splendid specimens were on view. I have seen people look incredulous when shown a living sponge growing on a submerged stick, and told that it was an animal. Little pockets in the sponge are lined with what are known as "collar-cells," from out of which long whiplike flagella wave. The movement of these flagella draw water through numerous pores into the sponge, where the particles of food contained therein are captured, the water passing out through larger orifices. Eggs formed in the sponge, develop into ciliated larvae, which swim about enjoying a brief free existence before settling down to the sedentary life of a sponge. There are also reproductive buds, called "gemmules," formed in the sponge, and these serve to carry it over periods of drought. When ponds dry up the sponges die, but the gemmules retain their vitality, and, when the wet season returns and the ponds are again filled with water, develop into sponges.

In the *Coelenterata* we have the first indication of a body-cavity, and see, thus low down in the scale of animal life, the stomach asserting itself. An example of *Coelenterata* is *Hydra*, an animal built up of two layers of cells. The only opening is the mouth, which is surrounded by five or more arms, or tentacles, which seize the food and press it into the mouth. The inner layer of cells absorb the nutrient part, the waste matter being rejected through the mouth.

The next higher group, the *Echinodermata*, has no representatives in our ponds and streams. Next comes a group of animals whose classification has caused a great amount of trouble, because of their great variety of form. The earlier naturalists dumped these all together, under the name *Vermes*. Any animal they could not fit in the other groups was thrust into this division. To-day the worms are separated into four divisions, or phyla, based on their shape. The *Platyhelminthes* were represented by the *Tricladia*, small planarian worms, sometimes very numerous; the *Nemathelminthes*, by *Gordius*, the long thread-worms so frequently found in water; and the *Nematodes*, small wriggling creatures, that are continually trying to twist their bodies into the shape of the figure eight, "vinegar-eels," taken from stale vinegar.

The *Trochelminthes* include the Rotifers, of many shapes, single and in colonies, free-swimming and sedentary. They all have a ciliary wreath, from which they take their name of wheel-animals. One of the exhibits showed *Melicerta*, a tube-building rotifer, busily engaged making "bricks" and adding them to its dwelling. The *Annulata* division is represented in our ponds by the Leeches, and by small segmented worms. The *Molluscoida*, the Polyzoa, commonly called moss-animals, from their habit of growing on submerged branches, or stones. They are groups of animals living and working for the common good of the colony. The individual animal is called a polypide, and the branching tubular structure in which they live is called the *coenecium* (meaning "common house"). The species are distinguished by the shape of the "statoblasts"—or resting spores, which, like the gemmules of the sponge, carry the life of the polyzoa over the dry season.

The crustacean exhibits ranged from the microscopic Copepoda, *Boeckella*, and the leaf-limbed Phyllopods, *Daphnia*, *Lepiduris* and *Branchinella*, up to the crab *Hymenosoma*, and the "yabbis," *Astacopsis*. Among the Insecta, exhibits illustrating life-histories—eggs, larva, pupa and imago—(living and mounted), of Beetles, Caddis-flies, Dragon-flies, *Chironomus*, *Culex*, and many others were shown.

The *Arachnida* was represented by the water mites, nimble little creatures of various form and brilliant colouring.

In the *Mollusca* we had living examples, also cabinet

specimens of the shells of *Unio*, the fresh-water mussel, and the pond snails, *Physa*, *Limneae*, etc.

The highest phylum *Chordata*, was represented by frogs (with slides showing their development), and fish, *Galaxias* and *Anaperca*.

Every phylum of animals, excepting the *Echinodermata*, is represented among the inhabitants of our ponds and streams. Where possible, living specimens of each of these phyla were shown, the large specimens in aquaria, and the smaller species, also sections and parts of the larger ones, under thirty-two microscopes.—J. SEARLE.

EXCURSION TO EAST WARBURTON.

Twelve members took part in the excursion to East Warburton on January 29, 30 and 31, 1927. The programme for the first morning was to visit the O'Shannessy bridge, via the Aqueduct, but, owing to insufficient directions, the outward journey finished on a disused tram-track a considerable distance below the channel. Although the hillside had suffered severely from last year's fires, the vivid new foliage on the charred tree-trunks, the dense bracken covering the slopes, and the glimpses of the Yarra winding through its tree-clad valley below, amply repaid our exertion. In the largest gully passed, an extensive growth of Giant Mountain Grass, *Glyceria dives*, was noted. Several species of beetles and their larvae were found within a Termites' nest, but only two specimens of the rightful owners were seen.

In the afternoon a trip was made to Big Pat's Creek, and its junction with the Mississippi Creek. The formerly beautiful gullies of both these creeks have been badly ravaged by bush fires. The tree-ferns are recovering, but the dense scrub that formerly embowered them has disappeared, and the dead wood that litters the streams and banks is an offence to the eye.

Monday morning was heralded by a Kookaburra chorus, in which apparently a dozen birds took part. Other bird calls, not so familiar, rang through the great trees surrounding the house. A pleasant half hour was spent in examining the extensive fernery constructed between three of the house buildings. Nearly all the local ferns were represented, as well as some from distant parts, and all showed a hardy, vigorous growth in the heavy clay soil. Enquiries for an unspoilt fern gully revealed the fact that one, bearing the unlovely name of Deadhorse Gully, existed some two miles further up the road, and the excursionists were soon "en route." An interesting rock section, in a small roadside quarry, was examined. The dip, strike, and jointing of the Silurian rock were very clearly illustrated in the southern leg of a large anticlinal fold. The narrow entrance to Deadhorse Gully was almost concealed by a blackberry tangle. A descent of a few feet revealed a roomy space, shaded by tree-ferns, Hazel and *Pittosporum*, the latter shedding its scarlet, sticky seeds. A tiny stream trickled down the gully and filled a small circular basin with clear, cold water. A hundred yards further up, the tree-ferns were larger and denser, and the varieties of smaller ferns more numerous. Some fine fronds of the Batwing Fern, *Histiopteris incisa*, were noticed; filmy ferns veiled the trunks of the tree-ferns. The return journey to Warburton was made in the afternoon.—A. E. RODDA.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART VII.

14. *C. ALBA*, R.Br. (white). "White *Caladenia*."

Stem fairly robust, up to 8 inches high. Leaf rather broad, hairy, robust. Flower usually single, large. Pedicel not slender, hairy. Perianth segments all white, rarely pink, spreading. Dorsal sepal broad lanceolate, erect at back of column. Lateral sepals and petals broad lanceolate, spreading, somewhat equally arranged. Labellum 3 lobed, broad, not clasping the column, or only slightly so. Column and labellum not barred as in *C. carnea*. Labellum with 2 rows of calli, and often tipped with yellow.

This rare white *Caladenia* may be mistaken for either a very large *C. carnea*, or a white form of *Glossodia major*. The two dorsal sepals and petals stand out like four outstretched fingers, and the dorsal sepal is not hooded. The colour is pure white, very rarely pink; the labellum may sometimes be of a very pale pink shade, with a pink tip. The pink forms often show a shade of heliotrope pink. This was first collected in this State at Mount Dandenong by Jack French, and subsequently at Ringwood.

It is recorded in *Flora Australiensis*, as a variety of *C. carnea*, Bentham remarking, "Flowers white. I can see no other difference."

Recorded from N.S.W. and Victoria. Flowers in September.

15. *C. CONGESTA*, R.Br. (crowded, referring to the calli.) "Black-tongue *Caladenia*."

Plant slender, somewhat hairy, sometimes glandular pubescent, 8 to 18 inches high. Leaf narrow-linear, slightly hairy. Flowers from pink to deep rose pink, 1 to 3 on slender pedicels. Petals and sepals covered with glandular hairs on the outside. Dorsal sepal shorter than lateral sepals, incurved or hooded over the column. Lateral sepals and petals elliptical-lanceolate, all spreading. Labellum on a long claw, lower half erect against the column, distinctly 3 lobed, the lateral lobes broadly acute, spreading, margins entire: middle lobe, oblong or narrow lanceolate, elongated, very narrow, margins entire, covered with thick crowded dark-crimson, almost black calli, covering the labellum to the incurved tip, at

first in 2 rows. Column incurved, with wide wings, often blotched pink.

This orchid is variable both in colour and height. Sometimes the colour is very rich and deep. Sometimes the flower stem is quite short and slender. But the long labellum, crowded with the almost black thick calli-masses, is sufficient to differentiate it from all others.

It is recorded from all parts but the N.W., and from New South Wales, South Australia and Tasmania. Flowers in late spring, often in November.

One correspondent reports that in places where the pastures have been topdressed with superphosphate, a very considerable improvement has occurred in the orchid flowers, this being one of the species referred to.

18. *C. ANGUSTATA*, Lindl. (narrow). "Slender *Caladenia*."

Somewhat hairy, but variable in that respect. Leaf solitary, linear, slightly hairy. Flowers 1-3 usually white, sometimes pink, rarely red. Dorsal sepal recurved over column. Lateral sepals and petals narrow linear, spreading. Labellum short, 3 lobed, the lateral lobes often incurved. Terminal end of central lobe recurved. Calli in 4 rows, white, often yellow, sometimes irregular. Column like that of *C. carnea*.

I cannot see why this plant should be retained as a species, except to prevent future botanists re-classifying it, for "species-splitting" purposes. It certainly is very like *C. carnea* and *C. testacea*, and its forms readily merge into those species. Rodway says, "The species is doubtfully distinct from *C. testacea*."

It flowers from September to November, and is recorded from all parts of the State. It is also common in Tasmania.

17. *C. TESTACEA*, R.Br. (brick-red). "Musky *Caladenia*."

Plant slender, 6 to 15 inches high, slightly hairy. Leaf similar, narrow. Flower dark red or red on outside, very rarely brick red, glandular hairy, white or very pale pink inside, 1 to 5 on slender stems. Dorsal sepal erect, incurved and concave. Lateral sepals and petals spreading, sepals longer than the petals. Labellum on movable claw, forward half recurved; margins entire, except towards the tip, where they are slightly denticulate—labellum 3 lobed, lateral lobes small, short and blunt: calli in 4 rows, but sometimes irregular towards

tip. Column widely winged and incurved, like that of *C. carnea*.

The *reddish brown*, or *dull brownish colouring* of these flowers, which are also numerous on the stem, distinguish it easily. It is nearly always very fragrant, giving out a *musky odour*, which again distinguishes it from other species, and which thus gives to it the vernacular name.

It occurs in all the Eastern States, including Tasmania, and flowers in October-November. Recorded from all parts of Victoria.

16. *C. IRIDESCENS*, Rogers. (Iridescent or rainbow coloured.) "Bronzy Caladenia."

Plant slender, 4 to 10 inches high, leaf narrow-linear, with clasping bract in middle of stem; all somewhat hairy. Flower solitary, rarely 2, rich dusky red, with iridescent golden or bronzy tints. Dorsal sepal erect, and much incurved over column. Lateral sepals and petals spreading, all glandular hairy on the outside. Labellum on short claw, 3 lobed, the lateral lobes clasping the column, with entire margins, and transverse red markings. Central lobe recurved and much crowded with long clavate calli, also on the margins, *the calli not being in regular rows*. Column incurved at its upper part, marked and blotched with red lines.

This is a beautiful and bronze red orchid, closely related to both *C. testacea* and *C. congesta*. It was first discovered at the Splitter's Falls in the Grampians by me in 1913; and a few days later was again collected by J. W. Audas, F.L.S. It is also recorded from the South. Flowers in September-October.

19. *C. CUCULLATA*, Fitz. (hooded). "Hooded Caladenia."

Plant slender. Leaf narrow linear—moderately hairy, 6 to 10 inches high; stem quite slender. Flowers white, often pale green tinged, sometimes pinkish or pink. Flowers sometimes dull on the outside. Dorsal sepal quite abruptly incurved over the column. Lateral sepals and petals not so spreading. Labellum 3 lobes, lateral lobes blunt, wide, with clear margins. Calli on middle lobe in four rows. Column bent forward under the hood of the lateral sepal.

This species resembles *C. testacea*, and except for colours and the unfringed margins of the labellum lobes, which are fringed in *C. testacea*, is quite doubtfully distinct. Recorded from the south and east, and also from N.S.W. Flowers in September-October.

20. *C. CÆRULEA*, R.Br. (sky blue). "Blue Caladenia."

Plant very slender, 3-7 inches high, slightly hairy. Leaf narrow linear-lanceolate, slightly hairy. Stem slender, somewhat *wiry, purplish red*. Flower solitary, bright sky blue, rarely white. Petals and sepals lighter on outside, and somewhat glandular hairy. Dorsal sepal erect, blunt. Lateral sepals and petals nearly of equal length, petals narrower. Labellum on claw, broad, 3 lobed; lateral lobes clasping the column, margins entire, having darker transverse lines. Middle lobe much recurved, narrow, entire or slightly fringed, *calli yellow*, in two rows extending to tip. Column winged, incurved.

This dainty little blue Caladenia is readily distinguished from the next species by its dark, wiry stem, and the yellow calli. It usually grows in dry situations, and flowers in August-September. Recorded from all parts of the State except the N.W., and from all the Eastern States and Tasmania. Rodway says that the latter record is doubtful.

21. *C. DEFORMIS*, R.Br. (deformed calli). "Blue Fairies."

Plant not very slender, somewhat hairy, 3 to 8 inches high. Leaf solitary, nearly glabrous, linear lanceolate, almost as long as the stem. Flower solitary, deep blue, rarely white or yellow. Sepals and petals lighter on the outside; dorsal sepal erect, or rarely incurved, lateral sepals and petals somewhat spreading, broad, somewhat falcate; Labellum sessile, clasping column at base, not very definitely 3 lobed, *blue or purple, denticular fringed*; calli in from 4 to 6 irregular rows, crowded, *usually blue*; column incurved, winged.

This blue Caladenia is larger and more conspicuous than the former species. The green, somewhat stout stem, and the blue calli distinguish it clearly from that species. It is often found in clusters of several flowers, whose underground tubers are united. Albino forms are occasionally found, while A. J. Tadgell recorded finding a cluster of plants with yellow flowers.

It is recorded from all parts of the State; and is found in all the other States except Queensland. Flowers from July to September.

16. *GLOSSODIA*, R.Br.

(Tongue-shaped—like a tongue).

Sepals and petals spreading, nearly equal. Labellum sessile, undivided, margin entire, not fringed, without calli or glands or plates on the disk, but, at the base 2 (sometimes united); linear clavate calli or appendages

erect against the column, and from half to nearly its whole length. Column erect, often incurved, 2 winged. Anther erect, 2-celled, the outer valves broad, the inner much smaller, the connective produced into a small point. Pollen masses, 4, granular.

Terrestrial herbs, usually hairy, with underground tubers. Leaf solitary, oblong or lanceolate, radical, from within a scarious (dry and membranous, not green) sheath, close to the ground. Flowers, 1 or 2, rarely 3, on an erect scape (stem), with a sheathing bract at or below the middle, and a similar bract under each pedicel. Flowers erect, blue or purple, rarely white.

The genus is endemic (limited to Australia.) There are 5 species, three of which are Western and two Eastern. These two species are found in Victoria. Both have blue flowers, and *G. major* is one of our commonest and best known species.

1. *G. MAJOR*, R.Br. (larger). "Wax-lip Orchid."

Plant slender, hairy, from 5 to 12 inches high. Leaf solitary, bright green, hairy, oblong or oblong lanceolate. Flowers, 1, 2, rarely 3; purple, rarely pale blue or white. Perianth segments, all wide, elliptic lanceolate, spreading, white or very pale purple at base, with purple dots. Labellum sessile, ovate-lanceolate, waxy, white and hairy at base; the recurved forward portion purple, glabrous, with entire margins, *having a purple sigmoid* (S-shaped) *appendage*, with a yellow two-lobed fleshy head, at extreme base. Column erect, incurved, broadly winged, especially at the upper part.

The "Wax-lip" orchid is often found in very numerous colonies. The tall plants and purple flowers being very distinctive and beautiful. It is often possible to collect hundreds in a small area. It is widely distributed all over the State. In the warmer and drier areas the purple coloring is very rich. In the Grampians, I, at one time, saw a colony of hundreds, all very pale, almost pale heliotrope pink. In these pale specimens, the basal dots to the sepals and petals are often absent. Records have been made of flowers having two labella. These can be classed as aberrant forms, or "freaks."

It is recorded from all the Eastern States and Tasmania; flowering from August to October.

2. *G. MINOR*, R.Br. (lesser—or smaller). "Small Wax-lip Orchid."

Plant dwarf, slender, hairy, the hairs sometimes being glandular. Stems not above 4 inches high; flower usually solitary, small, purple or purplish blue. Leaf lanceolate,

small; a sheathing bract at middle of stem. Sepals and petals oblong lanceolate. Labellum waxy, about 1-3 length of sepals, broad, somewhat hairy at white lower half; upper half wide, spreading, *with two appendages at base*, clavate, yellow, flattened. Column broadly winged.

This smaller *Glossodia* may easily be mistaken for a small form of *G. major*. But the paired yellow appendages at the base of the labellum are very apparent and distinct in *G. minor*. This orchid is very rare in Victoria and has only been recorded from the East. A. G. Hamilton records that in some districts near Sydney, the flowers occur in thousands. Flowers in August-September. Recorded from the three Eastern mainland States.

17. DIURIS, Smith.

(Two tails—referring to the long lateral sepals.)

Dorsal sepal erect, rather broad, clasping the column at the base, upper part open. Lateral sepals narrow-linear, almost herbaceous, spreading or deflexed, parallel or crossed; petals longer than the dorsal sepal, ovate-elliptical or oblong, on slender claws. Labellum usually as long as or rather longer than the dorsal sepal, deeply 3 lobed, the middle lobe much contracted at base with 1 or 2 raised longitudinal raised lines along the narrow part. *Column very short*, the wings produced into lateral erect lobes, but not continued behind the anther. Anther erect, 2 celled; pollen masses granular or mealy.

Terrestrial glabrous herbs with underground tubers. Leaves narrow, few, rarely many, at base of stem, with a few sheathing bracts higher up. Flowers 1, 2 or several in a terminal raceme, large and conspicuous, white, lavender, purple or yellow, often spotted or blotched; lateral sepals often green and channelled.

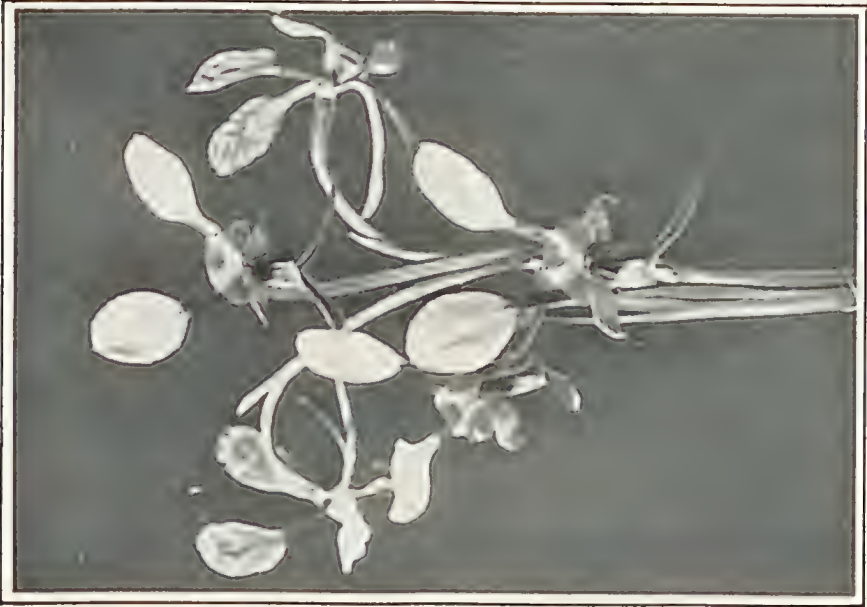
The genus is purely Australian, there being 25 species, occurring in all of the States. New South Wales has 17 species, Queensland 9, Victoria and South Australia 8, West Australia 7, and Tasmania 5.

Owing to the genus being so very readily distinguished by the long tails, i.e. lateral sepals, the descriptions will be here considerably reduced.

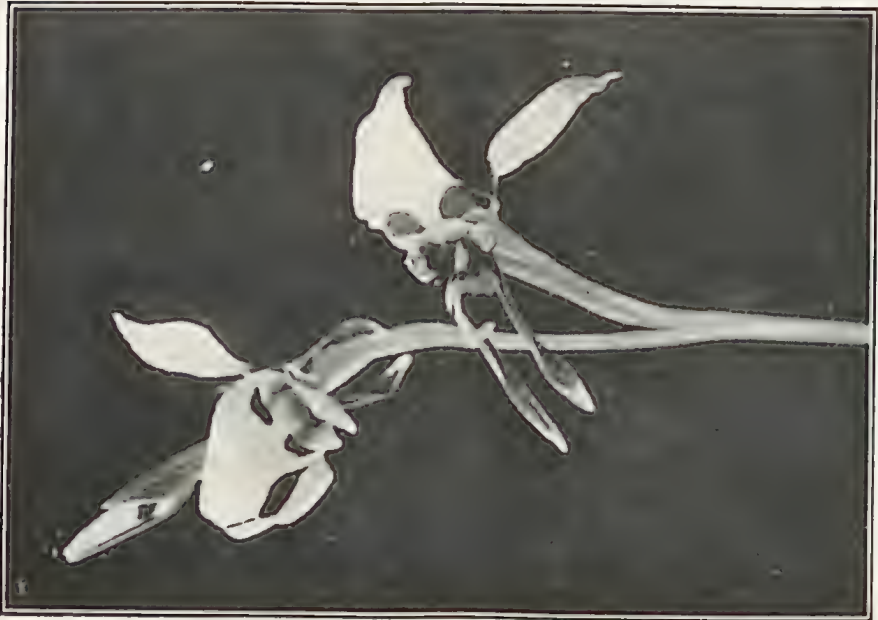
1. D. ALBA, R.Br. (white). "White Diuris."

Tall, leaves usually 2; lateral sepals much elongate. Flowers white or lilac, sometimes marked with purple; fragrant; Labellum having a raised central line between the 2 raised lines; central lobe wide, fan-shaped, often crenulate on margins. Lateral lobes of labellum very small.

Plate XIX.



DIURIS MACULATA, Sm.,
Leopard Orchid.



DIURIS SULPHUREA, R.Br.
Tiger Orchid.

This orchid is not always white, but is very variable in colour. Often in colonies where the plants grow, quite a considerable variety of shades and blotchings will be found. On that account (vide coloured illustration), some of the brighter forms may be taken for the next species.

Recorded from the 3 Eastern States. Found only in the S. and N.E., in this State, flowering in September-October.

2. *D. PUNCTATA*, Smith (dotted). "Purple Diuris."

Tall, leaves usually long, often only 2; flowers 2-5, heliotrope or purple. Dorsal sepal ovate, broad, large; petals long, spreading on a narrow claw. Lateral sepals very long, narrow linear, green, spreading, usually channelled, usually parallel. Flowers not blotched.

This light purple Diuris is always prized when collected, as it is one of our most beautiful of orchids. It often occurs in moist soil. The species name of *punctata* is a misnomer, for the flower is not spotted. The synonym given later, *D. elongata*, would be far more suitable, owing to the length of the tailed sepals.

Recorded from all parts of the State; and from Queensland, New South Wales and South Australia. Flowers in September to November.

3. *D. PEDUNCULATA*, R.Br. (stalked). "Snake Orchid."

Plant slender, glabrous; leaves 5-7 linear. Flowers medium size, 1-4 on slender pedicels, pale or canary yellow, rarely orange, often tinged with brown on outside. Dorsal sepal short, somewhat hooded over the column. Petals wide spreading, on green stalks. Lateral sepals free, green, parallel, channelled, not much longer than the labellum. Labellum flat, spreading almost widely heart-shaped, raised lines pubescent.

Called the Snake-flower by the aborigines. This orchid is often found in railway line enclosures in very large numbers. The canary or primrose yellow colour is very clear; and the flower is recognised also by its almost "squat" spreading habit. The "neck" of the stem just below the ovary is usually bent right over, giving the flower a downward facing.

Recorded from all parts of the State; and also from Queensland, New South Wales, South Australia and Tasmania. Flowers in August-September.

4. *D. PALUSTRIS*, Lindl. (Swampy). "Swamp Diuris."

Plants slender, not tall, from 4-6 inches high. Leaves 6-10, erect, narrow linear, often 2-3 the height of the flower stem; often channelled and bristly. Flowers small,

1 to 4 on long slender pedicels, yellow, blotched brown. Dorsal sepal ovate, dark coloured behind the anther; lateral sepals green parallel, longer than the labellum channelled. Lateral lobes of labellum erect; middle lobe oblong with 2 thick parallel fleshy raised lines, pubescent, merging into a single short raised line.

Usually found growing in moist or swampy locations. The abundant grass-like foliage, and the rather small dull yellow flowers distinguish the species. It is sometimes aromatic-fragrant.

Recorded from all districts; and also from Queensland, New South Wales, South Australia and Tasmania. Flowers in August-September.

5. *D. MACULATA*, Smith (spotted). "Leopard Orchid."

Plant moderately strong; from 8 to 12 inches high. Leaves 2-3 narrow lanceolate, channelled. Flowers up to 6; *yellow, irregularly blotched with brown, giving somewhat a purplish appearance*, the blotching being more marked on the back, than on the front of the petals and sepals. Dorsal sepal ovate, upright; margins sinuous or crenate; lateral sepals long, stout, somewhat broad, green, usually crossed when flower is fully opened. Petals conspicuously stalked, almost orbicular, much blotched on back. Labellum 3 lobed, lateral lobes, broadly crescentic, large, somewhat crenate; middle lobe somewhat saddle shaped in mature flower, the 2 raised lines being very prominent.

This is one of our commonest and widely spread Diuris. It is just as common in good woodland as in hard dry stony country.

It is recorded from all parts of the State; and from Queensland, New South Wales, South Australia and Tasmania. It flowers in August-September.

6. *D. LONGIFOLIA*, R.Br. (long leaved). "Tall Diuris."

Plant usually stout, 4 to 18 inches high. Leaves 2 or 3, long, linear lanceolate, channelled. Flowers bold and large, 2 to 5, *yellow and brown in "wallflower" shades*. Dorsal sepal short, broad, somewhat semi-circular in general outline, pointed. Lateral sepals about twice as long as the labellum, green, stout, channelled, not often crossed, wider at end, giving a somewhat spoon-shape appearance. Petals stalked, upright, usually oval. Labellum widely winged, the lateral lobes being about equal to centre one. Middle lobe wide, with single raised line, very rarely double, at base of labellum.

Often called "Wallflowers" by children, this is a very conspicuous Diuris. It is one of our taller species, the

brown and yellow shades merging into each other, and not being at all blotched.

Recorded from all parts of the State except the N.W.; and from all States except Queensland. Flowers in September-October.

7. *D. PALACHILA*, Rogers (spade shape-labellum.) "Broad-lip *Diuris*."

Plant slender, 4 to 12 inches high. Leaves 2-5, narrow. Flowers 1-3 on slender pedicels, yellow marked brown. Dorsal sepal yellow, with brown blotchings usually on back, short, bent forward over the labellum. Lateral sepals green, much longer than labellum, linear, channelled, parallel, occasionally crossed. Petals stalked, yellow, long oval, spreading. Labellum yellow, lateral lobes long, with dentate margins; *middle lobe distinctly spade-shaped*, spreading; 2 raised lines at base, merging to a central keel.

This species was for years collected as a yellow form of *D. maculata*. The broad spade-shaped labellum is its distinguishing feature.

Recorded from S.W., S., N.E., and E.; and also from New South Wales and South Australia. Flowers in September-October.

8. *D. SULPHUREA*, R.Br. (sulphur coloured). "Tiger Orchid."

Plant stout and somewhat robust, from 6 to 15 inches high. Leaves 2-3, long, lax or drooping. Flowers large, yellow, 3 to 6. Dorsal sepal ovate, somewhat bluntly pointed, recurved, *yellow*, with *two dark brown circular eye-like spots* at bottom. Lateral sepals much longer than labellum, acuminate, channelled parallel, occasionally crossed. Petals yellow, ovate, stalked. Labellum 3 lobed; lateral lobes wide, obovate, shorter than middle lobe; middle lobe wide, spreading, one raised line in centre lobe depressed at sides, a brown transverse blotch near tip.

This is to be distinguished from the South Australian species, *D. brevifolia*, by the single raised line on the labellum, as against two raised lines on that other species. The "eye" blotchings, and the clear rich yellow colour are characteristic. The buds are very pointed, sloping upwards, showing the brown dots very clearly before opening.

* Recorded from all parts of the State except the N.W.; also from Queensland, New South Wales, South Australia and Tasmania. Flowers in October-November.

A NEW GREENHOOD ORCHID.

PTEROSTYLIS GRACILIS, N.Sp.

BY W. H. NICHOLLS.

Planta glabra, gracillima, circa 12-30 cm. alta. Folia 2-3, grandia, ovalia vel ovali-lanceolata; petiolis gracillimis, sublongis, 2-9 cm. longa; caulina bracteata 3-4, sessilia, lanceolata, acuminata, 2-4 cm. longa. Flos solitarius, viridis, parvus; galea erecta, incurva; sepalum dorsale, petalaeque lateralia, subaequalia, acuminata. Labium inferius, erectum, cuneatum, angustum. Labellum grande, oblongo-ellipticum, apice obtuso, decurvo; lamina circiter 12 mm. longa; appendix robusta, curvata, penicillata. Columna circiter 12 mm. longa, erecta; lobi superiores, lineares, acuti, inferiores, angusti, obtusi.

Stigma ovatum in medio columnae.

A very slender, glabrous species, from 12-30 cm. in height. Stem-leaves 2-3, varying in shape, but usually oblong-lanceolate; often large, from 2-9 cm. long. On slender petioles, margins sometimes crenulate. Stem-bracts 3-4, sessile, lanceolate, acuminate, clasping at the base, from 2-4 cm. long; the lowest, small and scale-like. Flower small, solitary, green, apex of galea, brownish, about 2 cm. in length (minus ovary). Galea erect, gradually incurved; the dorsal sepal and lateral petals, about equal in length, acuminate. Lower lip erect, very narrow, cuneate; the lobes prolonged into filiform points, embracing the galea, and exceeding it by about 8 mm. Labellum large, oblong-elliptical, projecting beyond the sinus, tip blunt, often much decurved; under surface of lamina slightly concave towards the tip, upper surface slightly concave towards the base; under surface traversed by a narrow furrow corresponding to the raised central ridge on the upper surface. Appendage stout, thickly and shortly penicillate. Column, slightly shorter than labellum; upper lobes of wings toothed, lower lobes, narrow, obtuse, inner margins, shortly ciliate. Stigma, ovate, point directed upwards.

August, September, October.

This species evidently is widely distributed, having been collected in Victoria and Tasmania. The following are the localities where it has, so far, been found:—*Victoria*: Fern Tree Gully (W. H. Nicholls and F. J. Bishop, Aug., 1923), Greensborough (A. B. Braine,



Pterostylis gracilis, n.sp.

Sept., 1925), Wilson's Promontory (Dr. R. S. Rogers and Mrs. E. Coleman, Sept., 1926), Healesville (Mrs. E. Coleman, Oct., 1926), Wandin (D. Blair, Oct., 1926). *Tasmania*: Devonport to Smithton, N.W. Coast, August, September, October, 1926 (the Ven. Archdeacon Atkinson).

The plant approaches somewhat closely *Pt. alpina* Rogers; but it is much more slender than that species, and the flower is very much smaller. The large leaves and the stout labellum are similar to those of *Pt. cucullata*, R.Br.; but in no other respects does it resemble that well-marked species. In the field, the new species has been mistaken, on first glance, for *Pt. pedunculata* R.Br., with which it is sometimes found growing; but the resemblance is only superficial; heightened, no doubt, by the dark colouration of the fore-part of the galea and the slender character of both plants. *Pt. pedunculata*, being much more slender, leaves strictly basal, stem-bracts smaller, also flower smaller, and the labellum of different shape—bluntly ovate. In some of the localities mentioned, it appears to be fairly numerous. The type is in the National Herbarium, Melbourne.

Since writing the above description, I have received pressed specimens of this orchid from the Rev. H. M. R. Rupp, the well-known orchidologist, of Paterson, New South Wales. He collected the specimens in Tasmania in three distinct localities:—Mt. Nelson, Oct., 1920; Cascades, Mt. Wellington, Oct., 1920; Cataract Gorge, Launceston, Oct., 1922. See notes on species of *Pterostylis*, H.M.R.R., *Proc. Linn. Soc. N.S.W.*, 1925.

KEY TO PLATE.

Pterostylis gracilis, N.Sp.

- a—A typical plant, $\frac{3}{4}$ natural size.
- b—A plant with large leaves, $\frac{3}{4}$ natural size.
- c—Lamina of labellum, enlarged.
- d—Appendage of labellum, much enlarged.
- e—Lateral petal, enlarged.
- f—Lower-lip from inside, enlarged.
- g—Labellum, from below, enlarged.
- h—Labellum, from side, enlarged.
- i—Labellum, from above, enlarged.
- j—Column, from side, enlarged.
- k—Column, from front, enlarged.
- l—Leaf of plant.

NOTES ON THE COLEOPTERA OF NORTH- WESTERN VICTORIA.

Part XV.

BY J. C. GOUDIE.

EROTYLIDÆ.

Thallis australis, Lea. One of the fungus beetles, so called because the larvæ feed in the fungi found growing on the trunks of trees, or on logs.

COCCINELLIDÆ.

The more typical species of this family are our well-known "lady-birds," so common in gardens everywhere. Being carnivorous, both in the larval and perfect stages, they render great service by devouring the aphides and scale-insects that infest many plants.

7156. *Coccinella transversalis*, Fabr. Head and front of prothorax yellow, rest of these parts black. Elytra yellow, with the suture, two bracket-shaped markings, and a spot near the tips black.

7153. *Leis conformis*, Boisd. A larger beetle than the preceding; bright yellow, or red, with eight black spots on each elytron. A noted destroyer of the Peach aphid.

7168. *Alesia frenata*, Er. Yellow, the hind part of head and prothorax and two small spots on the latter black; elytra, the suture, tips, a sub-basal spot, and a double stripe joined at both ends, black.

7172. *Orcus australasix*, Boisd. A handsome dark-blue species, with three yellow spots on each elytron.

Scymnus australasix, Blackb.

S. australis, Blackb.

S. meyricki, Blackb.

S. meyricki, var. *obscuripes*, Blackb.

S. notescens, Blackb.

These are very small beetles, found on thistles, docks, etc.

S. notescens is black, with a large yellow blotch on each elytron.

Burcolus nigripes, Lea. Dark-brown; outer margins of prothorax and a stripe on each elytron, red; found under bark.

Rhizobius boucardi, Crotch.

7179. *Novius cardinalis*, Mulsant. The economic history of this small red and black "lady-bird" has been often related.

SUPPLEMENTARY LIST.

The following additional species have been collected or identified since the publication of the earlier numbers of these articles.

CARABIDÆ.

78. *Gigadema bostocki*, Cast, var. *intermedia*, Gestro. Included in Part I. of this paper as *G. carbonaria*, Sl. (M.S.).

102. *Pheropsophus verticalis*, Dej.

7292. *Philophlæus ornatus*, Blackb.

7273. *P. pygmæus*, Blackb.

261. *Adelotopus cylindricus*, Chaud.

440. *Philoscaphus tuberculatus*, Macl.

501. *Clivina australasiæ*, Bohem.

505. *C. coronata*, Putz.

952. *Thenarotidius* (*Bembidium*) *gagatinus*, Macl.

7464. *Amblystomus* (*Thenarotidius*) *metallicus*, Blackb.

Sarticus dixonii, Sl.

Loxandrus australiensis, Sl.

7467. *Notophilus montanus*, Blackb.

7551. *Microferonia adalaidæ*, Blackb.

7567. *Tachys mitchelli*, Sl.

898. *Simodontus convexus*, Chd.

Pseudoceneus iridipennis, Cast.

DYTISCIDÆ.

1084. *Hyderodes shuckhardi*, Hope.

HYDROPHYLLIDÆ.

Cercyon quisquilius, Linn.

7637. *Ochthebius australis*, Blackb.

STAPHYLINIDÆ.

Polylobus longulus, Oll.

Calodera eritima, Oll.

Conosoma lateripenne, Lea.

1245. *Quedius iridiventrus*, Fvl.

1253. *Q. semiviolaceus*, Fvl.

Philonthus discoideus, Grav.

1293. *Eulissus* (*Xantholinus*) *phænicopterus*, Er.

1312. *Lathrobium mutator*, Fvl.

Procirrus dolichoderes, Lea?

1364. *Pinophilus æniventris*, Fvl.

PSELAPHIDÆ.

Articerus constricti cornis, Lea.

A. cremastogaster, Lea.

Ctenisophus longicornis, Lea.

C. nigropiceus, Lea.

SCYDMÆNIDÆ.

Scydmaenus colobopsis, Lea.

PAUSSIDÆ.

Arthropterus howitti, Macl.

A. latipennis, Macl.

A. quadricollis, Westw.

HISTERIDÆ.

7862. *Tereetrius basalis*, Lewis.

PHALACRIDÆ.

Litochrus lautus, Blackb.

NITIDULIDÆ.

Notobrachypterus lutescens, Blackb.

Haptoncura meyricki, Blackb.

COLYDIDÆ.

Ditoma perforata, Blackb.

CRYPTOPHAGIDÆ.

7999. *Cryptophagus affinis*, Sturm.

LATHRIDIDÆ.

8006. *Lathridius minor*, Blackb.

8013. *Corticaria adelaidæ*, Blackb.

SCARABÆIDÆ.

Bolboceras tenax, Blackb.

Automolus granulatus, Blackb.

Haploopsis viridis, Blackb.

2599. *Diaphonia xanthopyga*, Germ.

BUPRESTIDÆ.

Melobasis obscurella, Thoms.

M. nobilitata, Thoms.

2895. *Stigmodera piliventris*, Saund.?

2982. *Chrysobothris australasiæ*, Hope.

3021. *Neospades (Coræbus) chrysopygia*, Germ.=
(*Cisseis dimidiata*, Macl.)

TRIXAGIDÆ.

3034. *Aulonothroscus elongatus*, Bonv.

MALACODERMIDÆ.

Laius cyanocephalus, Lea.

Carphurus myrmecophilus, Lea.

Helcogaster ceraticeps, Lea.

3440. *Balanophorus mastersi*, Macl.

PTINIDÆ.

Dryophilodes bifoveiventris, Lea.

D. eucalypti, Lea.

D. ubiquitous, Lea.

CEDEMERIDÆ.

Copidita sloanei, Blackb.

PEDILIDÆ.

Xylophilus mandus, Blackb.

BOSTRYCHIDÆ.

Xylion cylindricus, Macl.

CISTELIDÆ.

Hybrenia elongata, Macl.

CURCULIONIDÆ.

5228. *Belus brunneus*, Guer.5240. *B. hemistictus*, Germ.*B. punctirostris*, Lea.5248. *B. scalaris*, Germ.5251. *B. sparsus*, Germ.Three species of *Belus* remain unidentified.*Laemosaccus instabilis*, Lea.

Summing up, the list, now completed, yields a total of 45 families, 385 genera, and about 776 species. There is no doubt that this number would be largely increased by collecting in fresh localities, particularly to the west and north of the areas worked by myself. Mr. Chas. Oke, operating at Natya, Gypsum, and Lake Hattah, found many species not appearing in my list. But the "un-garnered grain" must be gathered before it is too late. The Mallee, like the "Sandringham Flora," with its interesting, often unique, inhabitants, is swiftly disappearing, and much remains to be done, in all branches of Natural Science.

I would like to acknowledge the generous assistance and encouragement which I have received from entomologists, both at home and abroad. It has been a great pleasure to work with them, and to each and all I tender my sincere thanks.

Caladenia praecox.—W. H. Nicholls writes:—"In the February issue of *The Naturalist*, Mr. Pescott remarks that "*C. praecox* might possibly be considered a variety of *carnea*." The two species are dissimilar. The facts are as follows:—*Cal. carnea*, Br. D.S. erect. *Col.* stout, with transverse red bands. *Lab.* stout, 3-lobed with transverse red bands; lateral-lobes broad and rounded; mid-lobe, fringed with a few calli; *Calli* on lamina stalked in 2 rows usually (up to 6 rows in occasional specimens) not extending beyond the bend. *Anther* with long point.—*Cal. praecox*, N. D.S. incurved, forming a distinct hood; thickly granulated. *Col.* slender, red blotched. *Lab.* narrow, hardly 3-lobed, margins deeply fringed, purple blotch near tip. *Calli* stout, short, fimbriated heads; 4 rows usually (up to 6 rows in occasional specimens) extending almost to the tip. *Anther* abrupt.

In a letter received from Mr. W. W. Froggatt, F.L.S., Entomologist to the Forest Commission, N.S.W., occurs the following passage:—"I have been collecting gall-making thrips for the last few years, and now have an expert in California, Dudley Moulton, describing the new species for me in our *Linnean Society*, N.S.W. They have some very curious habits. The gravid females of one we obtained from Gildandra, had the abdomen swollen like that of a queen white ant (Termite), and was the sole mother to a gall containing a thousand active larvae."—C.D.

EXCURSION TO THE BOTANICAL GARDENS.

A favorable change of wind, from a morning northerly to an afternoon southerly, on February 12, 1927, made the visit to the Botanical Gardens very pleasant to the 40 or more members and friends of the Club, including a contingent of nascent naturalists from Mornington, under the guidance of the Rev. Geo. Cox. The subject of the visit was to be a running glance over the wonderful collection of plants from all parts of the world which are especially interesting to plant geologists. We were particularly indebted to our Vice-President, Mr. St. John, for planning the easiest way to see what we wanted in the shortest possible time.

In the Museum, the foliage and seeds of the Maiden-hair Tree, *Ginkgo*, were examined, and it was explained by the leader how important this now single-specied group was in past times; to illustrate this, sketches of the foliage from Devonian, Triassic, Jurassic and Tertiary rocks were handed round. Other important fossil plant representatives, of the Fern-palms (Cycads), the Conifers and the Proteaceae (Banksias and Waratah) were illustrated by excellent Museum specimens, and then our walk through the Gardens commenced.

A fine Norfolk Island Pine, *Araucaria excelsa*, formed the subject of comments on the importance of this group, the Araucariae, in making up the bulk of the Wonthaggi coal seams, which, in the more shaly portions, show the cone-scales and fossilised wood, still identifiable, of these kinds of trees which undoubtedly formed extensive forests in Gippsland in Jurassic times.

The beds of Cycads, those plant anachronisms, made us reflect how old-fashioned they look among modern types, and what a curious aspect they must have imparted to the Jurassic landscapes, especially in England, where they are not now met with. To a geologist, this living collection is one of the glories of these Gardens.

Among the many other "living fossil" plants seen in the Gardens during the afternoon were the King Fern, with its fossil representative, *Osmundites*; the Sequoia of California, a marvel in longevity, with its 3,000 years of growth, and its fossil record of about 10,000,000 years; the Swamp Cypress (*Taxodium distichum*) of North America, which in past ages grew side by side with the Sequoias in the old Bournemouth forests of the South of England, but which, like the redwoods, are now only found in North America.

The group of the living Proteaceae in the Gardens drew forth comments on the former prevalence of the West Australian *Dryandra*, the *Banksia*, *Hakea* and *Lomatia*, in the old Tertiary forests of Australia, as far back as three million years ago; and the grounds were considered for supposing the former existence of a land connection between South Africa and Australia, countered by other theories of seed-drift and oceanic currents.

Romantic theories of former geographical connections were touched upon in the presence of some fine examples of the Strawberry Tree, *Arbutus unedo*, and the modest little London Pride, *Saxifraga umbrosa*. These plants seem to show a former connection of Ireland with the Iberian Peninsula, for, beyond Southern Europe, they now grow only in the West of Ireland. Here, again, seed dispersal may account for their strange distribution. One could spend weeks, nay, months, in our beautiful Gardens, and still learn more and more of the fascinating history of our living plants.—F. CHAPMAN.



NOTES ON XIPHOCARIS COMPRESSA

The common little fresh-water crustacean, *Xiphocaris compressa*, found right through Eastern Australia, and as far north as Japan, is well known to aquatic zoologists. Yet, I think, the early stages of its life history have never been recorded. I first found the zoea in the Richmond quarries, and exhibited specimens at a meeting of the Microscopical Society, in 1913 or 1914.

In 1917-18, a fortnightly examination of the micro fauna of the lake in the Botanical Gardens was carried out by Messrs. J. Shephard, Stickland and myself, and in the early summer months the zoea, 2 mm. to 6 mm. in length, were found to be very numerous in the plankton. Attempts to breed *Xiphocaris* in indoor aquaria have been unsuccessful, and I think the reason for this was discovered during this period of examination of the lake fauna.

On one occasion, a female *Xiphocaris* was seen on an aquatic plant, right at the surface of the water. It was observed to hold on to the plant with its legs, ventral side uppermost. It then thrust its abdomen out of the water and began to move its pleopods slowly to and fro, so that the attached eggs had the benefit of a sun-bath. After these operations had been watched for some time, the hand-net was slipped under it, and the specimen deposited in a collecting jar. It was hoped that the well-developed eggs would hatch out; but after a day or two in the aquarium, the animal exuviated, discarding its eggs with its cast-off skin. I have known the same thing to occur before, and have come to the conclusion that an occasional sun-bath is necessary for the proper development of the eggs of *Xiphocaris compressa*.—J. SEARLE.

NEST ROBBERS.

The pilfering of nesting-material is not a common practice in Birdland, and I think that, when it occurs, the birds concerned are not aware that they are pulling a neighbor's home to pieces. The nest, to them, is like a mass of wool torn from the back of a sheep, and is regarded merely as a convenient supply depot. Some birds will return again and again to the same spot when gathering nesting material, and I have found scores of nests through this habit. The habit of pilfering is more commonly displayed by the Brown-headed Honeyeater (*Melithreptus brevirostris*), than other species I have observed, and I photographed two of the birds at a Black-and-White Fantails' nest. In spite of my efforts, and the angry attacks by the owners, the nest was eventually pulled to pieces, and the material used to construct the Honeyeaters' nursery.—L.G.C.

Field Naturalists' Club of Victoria

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V. Miller.

EXCURSIONS.

SATURDAY, MARCH 19th.—Clematis Gully, Belgrave. Object:
Ferns. Leader: Mr. F. Pitcher. Meet at Flinders Street
Station in time for 9.10 a.m. train to Belgrave. Lunch to be
taken. If time permits, Sherbrooke Gully will be visited.

SATURDAY, MARCH 26th.—Burnley Gardens. This excursion
has been cancelled, as the Leader (Mr. E. E. Pescott) will be
out of town on this date.

SATURDAY, APRIL 9th.—Mentone to Black Rock. Object:
General. Leader: Mr. L. L. Hodgson. Meet at Flinders
Street Station for 1.10 p.m. train. It is proposed to follow
the coast from Mentone to Black Rock, where the tram may be
taken to Sandringham. Those members desirous of continu-
ing the walk to Sandringham should provide themselves with
provisions for an al fresco meal.

EASTER EXCURSION, APRIL 15th to 19th.—Toolangi. Object:
General. Leader: Mr. A. E. Keep. Final arrangements will
be notified in April "Naturalist."

NOTE.—As it is proposed to publish a list of members in the April
issue of the *Naturalist*, members are requested to notify the
Hon. Secretary as early as possible of any changes of address,
and particulars of the branch of natural history in which they
are most interested.

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THE JOURNAL AND MAGAZINE

— OF —

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Published April 7, 1927

Hon. Editor: CHAS. BARRETT

The Author of each article is responsible for the facts and opinions recorded.

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Field Naturalists' Club of Victoria

ROOMS—ROYAL SOCIETY'S HALL, VICTORIA STREET, MELBOURNE

BUSINESS PAPER FOR MONTHLY MEETING

MONDAY EVENING, 11th APRIL, 1927.

1. Correspondence and Reports.

2. Election of Members.

AS ORDINARY MEMBERS

PROPOSER:

SECONDER:

Miss R. Rigg,

Mr. G. Rigg,

20 Finch Street,
East Malvern.

Mr. G. Coghill. Mr. L. L. Hodgson

Mr. W. H. McCartney,

Mrs. W. H. McCartney,

42 Adelaide Street,
Malvern.

Miss G. Nokes. Mr. L. L. Hodgson

Mr. N. H. Seward,

457 Bourke Street,
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Centre Road,
Bentleigh.

Mr. L. L. Hodgson Mr. C. A. Lambert

Prof. A. J. Ewart, D.Sc.,

F.R.S., F.L.S.,

University, Carlton.

Mr. L. L. Hodgson Mr. H. B. Wil-
Hamson, F.L.S.

3. Nominations for Membership.

4. General Business.

5. Remarks by Exhibitors relative to their Specimens.

It is particularly desired that members having interesting natural specimens, should exhibit them at the Club's meetings, and, if possible, make a few remarks concerning them; also furnish the Hon. Secretary with written particulars for record in the Minutes and "Naturalist." Brief descriptions should accompany the exhibits for the benefit of fellow-members.

6. Fish Evening.

A lecture will be given by Mr. F. Lewis, Chief Inspector, Fisheries and Game Department, illustrated by lantern slides.

The Committee will be pleased to receive offers of papers, which should be sent to the Hon. Secretary.

7. Reading of Natural History Notes.

Members who may note any unusual occurrence are requested to give a short account thereof at the meeting.

8. Exhibition of Specimens and Conversazione.

ALTERATIONS TO RULES.

Notice is hereby given that a Special Meeting will be held at 7.45 p.m. on 11th April, 1927, for the purpose of considering the proposed alterations to Rules, as published in the March *Naturalist*, and also the following proposed addition to Rule 4, Clause (b):—

"Provided also that the Secretary and/or Treasurer shall, while he continues in office, be exempt from payment of members' subscription, but shall ipso facto be deemed a financial member of the Club."

The Victorian Naturalist

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No. 520.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held on Monday evening, March 14, 1927. The President, Mr. E. E. Pescott, F.L.S., occupied the Chair, and about 85 members and friends were present.

CORRESPONDENCE.

From Under-Secretary for Victoria, stating that the Club's representations regarding the prohibition of the sale and use of the pea-rifle, would receive consideration.

REPORTS.

Reports of Excursions were given as follows:—Eltham, Mr. C. H. Borch; Worri Yallock, Mr. F. Chapman, A.L.S.; Zoological Gardens, Mr. L. L. Hodgson.

ELECTION OF MEMBERS.

The following were elected as ordinary members:—Rev. Robt. B. McConchie, Methodist Parsonage, Jupiter street, Caulfield; Mr. J. Clark, F.L.S., National Museum, Melbourne; Miss Mary Vinnicombe, 98 Wright street, Middle Park; and as Associate Member, Master Howard M. Bainbridge, University, Carlton.

GENERAL.

The Secretary stated that recently, Mr. E. Hanks had met with a serious accident. It was decided that a letter of sympathy be sent to Mr. Hanks.

The President announced that Miss F. Smith had recently suffered bereavement in the loss of her mother, and it was resolved that a letter of condolence be written to Miss Smith.

Notice of motion was given of the proposed alterations to the rules as published in the March "Naturalist." Mr. A. J. Tadgell gave notice of motion of the proposed addition to Rule 4, clause (b)—"Provided also that the Secretary and/or Treasurer shall, while he continues in office, be exempt from payment of member's subscription, but shall *ipso facto* be deemed a financial member of the Club."

PAPERS.

Mr. H. W. Davey, F.E.S., read a paper dealing with Japanese Newts, several living specimens of these creatures being exhibited in a large glass bowl.

Mr. J. A. Kershaw read a paper on "Australian

Snakes and Lizards," in which he described the distinctive markings, etc., of the various species. A number of excellent lantern slides was shown in illustration of his remarks.

EXHIBITS.

By Miss Raff, M.Sc., F.E.S.: Snake back-bone necklace.

By Zoology School, University (per Miss J. Raff): Crocodile hatching from the egg; cast skin of Lizard.

By Mr. A. C. Nilson: Specimens of Imperial Blue Butterfly, *Ialmenus evagoras*, bred from pupae taken on a wattle tree at Eltham on February 19. The female emerged about March 6, the male three days later. Fossil air-breathing snail, *Hercynella*, collected at Killara.

By P. R. H. St. John: Dried specimens of *Eucalyptus nova-anglica* (Deane and Maiden), "Red, or New England, Peppermint," collected by exhibitor at Bayswater, January, 1913, and at Killara, February, 1927; and by Mr. H. B. Williamson, at Antony's Cutting, January, 1915. New record for Victoria. Found also in New South Wales (1898), and Southern Queensland.

By Mrs. A. H. E. Mattingley, Sea-snake, killed on beach at Magnetic Island, Queensland. Tortoise eggs, laid in captivity.

TRILLERS' NESTING TRIALS.

A pair of Trillers (*Lalage tricolor*), having built their small and shallow nest in a Red Box, on a branch about 16 feet from the ground, and overhanging a clothes' line, near our house at Eltham, I had the opportunity of observing them closely. Arriving here in September with a large flock, the birds began to build on October 2nd or 3rd, both working at the nest; the male bird was seen shaping it. On October 9th I observed the male sitting on the nest. The three eggs were hatched out on the 23rd. The parent birds added bits of cobweb and other materials to the nest during the period of incubation. They were a very trustful pair, and soon became reconciled to a camera fixed on a wooden bracket close to the nest. The male could be touched with the hand.

Brooding was a duty shared, the birds relieving each other at intervals of 10 to 20 minutes. On October 30th, the nestlings were blown out of the nest, being found on the ground beneath it, dead. On November 5th the same pair of Trillers had started another nest, in a tree close by, using the material from the old nest. Before it was finished a gale blew it to pieces. I believe that a third nest was built in a tree in the next paddock, as the birds were about for a few weeks. Then, as the waterholes dried up, they went farther afield.—W. C. TONGE.

VICTORIAN REPTILES.

BY JAS. A. KERSHAW.

The following is an abstract of a lecture on Australian Reptiles delivered before the Club on March 14th, and by request is restricted to Victorian species of Snakes and Lizards. The two groups are represented in Victoria by probably not more than 70 species.

OPHIDIA, OR SNAKES.

Practically all Victorian Snakes are poisonous, though some are too small to be dangerous. The really deadly species are the Tiger, Black, Brown, Copper-head, and the Death Adder. Although some of these are fairly numerous in certain localities, death from snake-bite is rare. The only harmless Victorian species are the small, burrowing, Blind Snakes (*Typhlops*), of which there are seven representatives; and the Carpet Snake. The former are restricted to the dry and warm areas in the north and north-western parts of the State, where they burrow with great rapidity into the loose, sandy soil, and are frequently ploughed up. They are long and cylindrical in shape, the tail being as thick as the head, and furnished with a short, horny spine; while the body is covered in small, closely-fitting, and highly polished scales. The mouth is exceedingly small, the lower jaw toothless, while the rudimentary eyes are covered by scales and not easily discernable. These snakes are frequently found in Termites' mounds, where they find an abundant food supply. They eat insects, worms, grubs, etc.

In Victoria, with the exception of the Brown Snakes, all the venomous species produce their young alive.

THE CARPET SNAKE (*Python spilotes*, var. *variegata*) occurs, but is very rare in the northern parts of the State. It is common throughout the northern parts of Australia. It is, of course, non-poisonous, and, like all Pythons, crushes its prey, principally birds and the smaller mammals, in its coils before swallowing it. It attains a length of from 10 feet to 12 feet. Like most Pythons, the Carpet Snake lays about 30 eggs, which it protects by coiling itself upon them.

In Victoria, three species of Brown Snakes have been recorded, two of which are rare, and occur only in the northern parts of the State.

THE COMMON BROWN SNAKE (*Demansia textilis*), which is now practically restricted to the northern and western districts, at one time extended its range to the

southern coast. Specimens in the National Museum were captured at Queenscliff, South Brighton, Heidelberg, and Footscray, while a young one recently was captured at Pentridge. This is one of the really dangerous species, and reaches a length of at least six feet. It lays from 15 to 25 eggs, which are deposited usually under a log or among dead leaves. The young do not resemble the adult, but are very pale-brown in colour, with a black patch on the head, separated from another black patch on the neck by an orange band. Frequently they are banded with black rings, extending from the head to the tail. Many examples have only two or three rings, while others have none at all. As the Snakes become full grown, these markings disappear.

THE BLACK SNAKE (*Pseudechis porphyriacus*) occurs throughout the eastern and south-eastern parts of the State. At one time it was found as close to Melbourne as Studley Park, but is now rarely met with except in the eastern parts of Gippsland. It is not found in Tasmania. Although specimens measuring seven feet, and even eight feet in length, have been reported to have been seen, it is very doubtful if this species ever much exceeds six feet. This dangerous Snake prefers damp situations, and readily takes to the water, where it can remain immersed for a considerable time. It is viviparous, bringing forth from 15 to 20 young ones.

THE COPPER-HEAD (*Denisonia superba*) is the commonest of all Victorian deadly Snakes, and the species most frequently met with. It is not nearly so vicious as the Tiger Snake, and does not show fight in the same way. It is still found within short distances of Melbourne, and is abundant throughout eastern Victoria, Tasmania (where it is frequently called the Diamond Snake), and on the islands of Bass Strait, and extends into southern New South Wales. Although this species is reported to grow to a length of between five feet and six feet, I have never seen one approaching that length. The usual size is from three feet to four feet.

The colour of the back varies from dark-brown to light reddish-brown—in some cases nearly black. The very dark specimens frequently are mistaken for Black Snakes, from which they may readily be distinguished by the scales on the underside of the tail being in a single row, instead of a few single, and the remainder double. The V-shaped marking on the back of the head, which, however, is always more prominent in young examples, also serves to distinguish

them. Like the Tiger Snake, this species usually produces a large number of living young, up to about 30 at one time.

THE TIGER SNAKE (*Notechis scutatus*) generally is regarded as one of the most deadly of our poisonous snakes. It is certainly one of the most vicious, and when irritated, flattens and extends the skin of the neck to twice its normal width, and strikes at its enemy with remarkable quickness. It is very numerous, especially in the eastern and south-eastern parts of the State, and frequents both marshy and fairly dry localities. In the seventies it was common around Melbourne, specimens in the National Museum being recorded from the University grounds, Studley Park, Prahran, and other suburbs. In Tasmania, where it is known as the Carpet Snake, this species is very common; and it is spread over the greater part of Australia. In colour it is usually light brown, with a series of broad, darker, cross-bands.

Although sometimes confused with the Copper-head, the Tiger Snake may usually be recognised by the cross-bands, which are most pronounced just after casting its skin. The usual length of this Snake is from three feet six inches to four feet, though it is said to reach between five and six feet. Its food consists largely of frogs and lizards, and occasionally young rabbits. The Tiger Snake is unusually prolific, and, according to Lucas and Le Souëf, produces as many as 50 or more young in a litter. The greatest number I have counted is 37. Like some other species, the Tiger Snake takes readily to water, and has been frequently seen swimming in creeks in Gippsland.

THE DEATH ADDER (*Acanthophis antarcticus*) is found, in suitable localities, in all the States, as well as in New Guinea and adjacent islands. It is short and thick, with a broad, flattened head, and a short, rapidly tapering tail, terminating in a pronounced spine. It rarely exceeds two feet in length, and varies considerably in the colour, which, to a great extent, is similar to its immediate surroundings. It is very sluggish, and will rarely make any movement, even when lying in an exposed position, unless interfered with, when it strikes with great quickness. It is found usually in sandy localities, and in Victoria, is restricted to the dry areas of the north-west. The spine on the tip of the tail is widely believed to be its sting. This species is one of the most deadly of our Snakes, though apparently not so venomous as the Tiger Snake.

THE WHITE-LIPPED SNAKE (*Denisonia coronoides*) is one of the most common among the smaller species. It grows to a length of from 12 to 15 inches, and is usually met with in open, heathy or grass country, particularly in the southern and eastern parts of the State. Usually, it is of a pale brown colour, and may be readily distinguished from all other species by the white streak along the upper lip, extending for a short distance along the side of the neck.

THE LITTLE WHIP-SNAKE (*Denisonia flagellum*), is also common in the southern districts, and often is seen within a short distance of Melbourne. It was formerly plentiful at Brighton, Caulfield, and Studley Park. Like the White-lipped Snake, it is practically harmless, although the poison fangs are present. It is brown along the back, and white on the underside. The crown of the head is black.

BLACK-AND-WHITE RINGED SNAKE (*Furina occipitalis*).—This small, and practically harmless snake, is one of the easiest to recognise, and cannot be confused with any other species. The whole of the body and tail is encircled with alternate bands of black and white. It is common near the Murray, and throughout the Mallee, and is never found in the southern districts.

Other small species, which, though rare and restricted to the north and north-western districts in Victoria, are more common in some of the other States, are—

Denisonia gouldii: about 15 inches in length, yellowish-brown above, with head and nape black, and the upper lip yellowish.

Denisonia nigrostriata: distinguished by the dark brown vertebral stripe. It is yellowish above, with the scales edged with brown, and the head dark brown above, and grows to 12 or 14 inches in length.

Rhynchelaps australis: a species only recently recorded from Victoria, which may be readily distinguished by its unusual colour and markings. It is red above, with a series of narrow, dark cross-bands extending from the head to the tip of the tail, and formed of yellowish, black-edged scales. On the head is a broad, black band, and another on the neck. Its length is from 9 to 12 inches.

THE YELLOW-BELLIED SEA SNAKE (*Hydrus platurus*).—This is the only sea Snake recorded from Victoria, and is quite an accidental visitor. So far as I am aware, only three or four specimens have been captured on our shores. It has a very wide range over the Indian and Pacific Oceans, and is common in the more tropical parts

of Australia. In length it is usually from two to three feet, and is black or dark brown on the back, and yellow on the sides. The tail is yellow with black spots or broken bands.

Like all Sea Snakes, this species spends its whole existence in the sea, and does not survive long when brought ashore. It is viviparous.

LACERTILIA, OR LIZARDS.

In Victoria there are about 50 species of Lizards, or about one-eighth of the total number of the Australian species. Lizards are terrestrial reptiles, the majority of which have two pairs of limbs, well developed, and approximately of equal length. Some, however, have no external limbs, others have only the hind pair, while others again possess them in a more or less rudimentary state. Nearly all dwell on or near the ground, among rocks, or beneath the surface; some inhabit trees, while one species spends much of its existence in the water. There are no poisonous Lizards in Australia, in fact, the only known poisonous Lizard is the Gila Monster, of America.

Very few Lizards utter any cry; the majority make a hiss. A few, however, particularly the Geckos, utter a sharp and chirping cry, or a rather prolonged, plaintive note. The majority of the species lay eggs; some bring forth their young alive.

GECKOS.

These are nocturnal, perfectly harmless Lizards, which hide under bark of trees, stones, or logs, during the day, and hunt for insects. The toes, in some species, are furnished with sharp claws; in others, with adhesive discs, which enable the Geckos to run up and down smooth walls, tree-trunks, or even on window panes. The eyes are large, and covered, as in Snakes, by a transparent lid. The tail is usually thick and remarkably brittle, and if accidentally lost, is rapidly reproduced. Not infrequently, two, and even three, tails replace the one lost. The Geckos lay round, hard-shelled eggs.

Victoria is represented by six species, none of which occur in the southern districts.

THE MARBLED GECKO (*Phyllodactylus marmoratus*) is the commonest species. It hides during the day under the loose bark of trees, or under logs, coming out at night in search of food, and is very quick in its movements. Usually it is of a greyish colour, variegated with dark-brown markings, which take the form of interrupted, longitudinal, and transverse, wavy lines. The tail

is long and swollen, tapering towards the tip, and remarkably brittle. Specimens are commonly found with three, and even four, tails.

Gymnodactylus miliusii is restricted to the warmer parts of the State, where it occurs commonly under bark, logs, and stones. The tail is thick and swollen, and the body and limbs are covered with small, round, conical tubercles. The colour of the upper-surface is chestnut-brown, with several narrow, white, cross-bands on the back and tail, variable in extent. This species, although timid, often takes up its abode in houses, and is commonly seen in the evenings catching flies on the windows.

Diplodactylus vittatus, usually found on the ground under stones, is brown on the back, with a light-coloured, wavy, vertebral band, edged with dark brown.

PYGOPODIDÆ.

THE SCALE-FOOTED LIZARDS, OR SLOW-WORMS, are long, Snake-like reptiles, without fore-limbs, and with the hind-limbs represented externally by small scaly flaps. In the skeleton the hind-limbs show minute toe-bones. The tail is much longer than the body, and very brittle. They travel very quickly with side to side movements, the head being well off the ground. There are five species in Victoria.

THE PYGOPUS, or Common Slow-Worm (*Pygopus lepidopus*) is a perfectly harmless Lizard, but because of its close resemblance to a Snake, it is generally killed on sight. The scaly flaps representing the hind-limbs usually are pressed close to the body, and are not easily discernable. The tail is so brittle that, if seized, it is left in the hand, while the head and body wriggles quickly away to safety. As with most of the Lizards, the tail is replaced by a new one. The colour of this species is extremely variable, greyish, brown or lavender, with several longitudinal rows of black, white-edged spots. Some specimens are of a uniform brownish colour, and practically devoid of markings.

FRASER'S SLOW-WORM (*Delma fraseri*) is of a uniform greyish-brown without markings, or with blackish transverse markings on the head, snout, and sides of neck. It grows to about 15 inches in length. It is common in the Western district, and is often turned up by the plough.

THE STRIPED SLOW-WORM (*Delma impar*) is often found coiled up under stones, and is easily distinguished by the series of oblique, narrow, alternating, light and

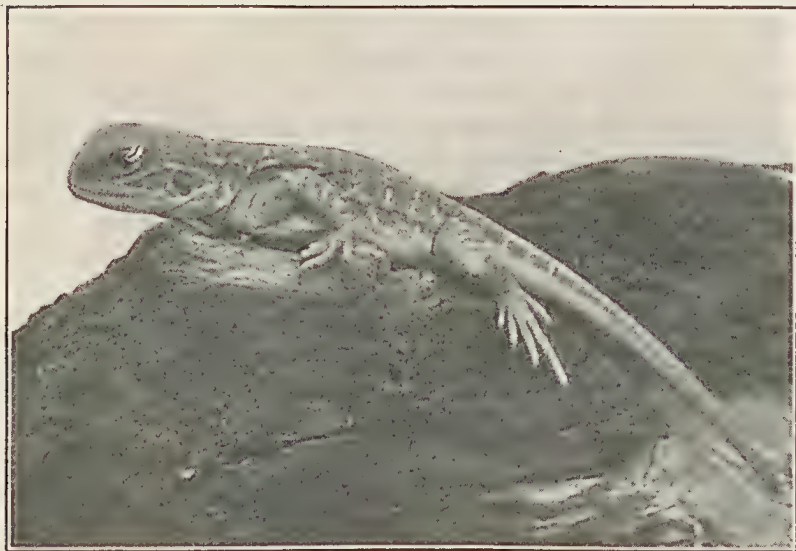
dark lines on the sides of the tail. Large numbers were turned up by the pick and shovel during the sewerage construction works at Werribee.

THE LITTLE SLOW-WORM (*Aprasia pulchella*) rarely exceeds six to eight inches in length, and may be distinguished by a series of very fine, longitudinal lines on the back and tail.

BURTON'S SLOW-WORM (*Lialis burtoni*) is very variable in colour, grey, brown, reddish or yellowish, and with a variety of markings. The head is longer and more pointed than any other species of this family. It is common in the Mallee district.

AGAMIDÆ—AGAMIDS, OR DRAGON LIZARDS.

This family contains a rather variable group of Lizards, usually with a large head, stout body, and a



The Painted Dragon.

Photo. C. Barrett.

long, tapering, but not fragile, tail. It includes the so-called "Blood-sucker," so commonly met with at Brighton and Beaumaris; the Jew Lizard, or Bearded Dragon, and many other similar kinds. When alarmed they open their mouths widely, and swell out the body, which gives them a very ferocious appearance, but they rarely bite.

THE COMMON DRAGON (*Amphibolurus muricatus*) is one of the commonest Lizards met with on the sandy, heath and ti-tree districts around Port Phillip Bay, and

has long been known under the popular, but very misleading, name of "Blood-sucker." It is a harmless creature, and may be frequently seen basking in the sun in open places adjacent to cover, or on a fence or fallen log. Its ashy-brown, or dark brown colour, mottled with darker patches, so nearly resembles its immediate surroundings that it is often very difficult to distinguish it. The eggs are usually laid in sandy places under logs or sheets of bark.

THE JEW LIZARD (*Amphibolurus barbatus*) is much larger than the preceding species; and is easily distinguished by the thick, beard-like cluster of long spines fringing the head behind the ears and lower jaw. When alarmed it opens its mouth widely, hisses, inflates its body, and erects its frill, and will bite savagely, but without causing harm. They will live a long time in confinement. The number of eggs laid is said to be from 12 to 14.

THE WHITE-STREAKED EARLESS LIZARD (*Tympanocryptis lineata*) is about five inches in length, and brown in colour, with a series of five longitudinal light lines running down the back. It may be recognised from the young of the Common Dragon by the ear-openings being entirely concealed. It is not uncommon along the banks of the Saltwater River, and on the open basalt plains to the north of Melbourne.

THE WATER LIZARD (*Physignathus lesueurii*) occurs throughout eastern Australia, from Queensland to Victoria. In certain parts of Gippsland, where it is known as the "Gippsland Alligator," it frequents the rivers and creeks, and may occasionally be seen basking in the sun on the rocks bordering the streams. It grows to about three feet in length, and is of a dark-olive colour, with darker and lighter cross-bands, most marked on the tail. The sides of the throat are marked with lines of blue and yellow.

VARANIDÆ—LACE LIZARDS, OR MONITORS.

These Lizards, commonly known as "Iguanas," or "Goannas," are distinguished by the long and deeply-forked tongue, which is furnished at the base with a sheath, into which it can be withdrawn, as in Snakes.

Two species—the Common Lace Lizard, or "Goanna" (*Varanus varius*), and Gould's Monitor (*Varanus gouldii*), occur commonly in Victoria. The former lives usually in trees, but often is found on the ground. It

can run with great speed, readily takes to water, and swims well. The food of Monitors consists of birds and their eggs, small mammals, such as young rabbits, and Lizards, etc. As is well-known, these reptiles cause much trouble in poultry yards. A full-grown specimen, measuring six feet in length, was shot on the Murray River, and on being opened, was found to contain three unbroken eggs of the Water Hen. Monitor Lizards lay about a dozen white eggs.

GOULD'S MONITOR (*Varanus gouldii*) is smaller and much lighter-coloured than the Lace Lizard, and when alarmed does not take to trees, but keeps to the ground. It is restricted to the dry north-western part of the State. Some specimens kept in confinement, fed freely on chopped-up meat, and when disturbed, opened their mouths widely and hissed loudly, but rarely attempted to bite.

SCINCIDAE.

This family embraces a number of the smaller species showing great variety of form. Some have four limbs; in others they are quite rudimentary. The toes are variable in number. Some are viviparous. The family includes the well-known Blue-tongued and Stump-tailed Lizards.

THE STUMP-TAILED LIZARD (*Trachysaurus rugosus*) is common throughout the western part of the State. The body is covered with large, thick, rough scales, suggestive of a pine cone. The head and tail are both short and thick, and the limbs very short. It is so very sluggish in its movements, that it has received the name of Sleeping Lizard. The tongue is blackish-purple. They usually give birth to a single young, though I once obtained a specimen in the Wimmera district with two young ones. Although this Lizard is known to feed on small reptiles and insects, it is fond of a vegetable diet, and is said to eat fungus and *Styphelia* berries. I kept one alive for some years feeding it chiefly on finely chopped meat.

BLUE-TONGUED LIZARDS: Three species occur in Victoria. They are smooth-scaled, long-bodied, harmless Lizards, usually found basking in the hot sun in open places, and are easily captured. The method of reproduction is interesting in that while one species is oviparous, another gives birth to 12 or 14 young alive.

When irritated, they appear to expand their bodies with air, which they expel with a sound not unlike the blowing of a bellows.

THE NORTHERN BLUE-TONGUE (*Tiliqua scincoides*) usually met with north of the Divide, though it also occurs in Tasmania, and as far north as Cape York and Darwin. It is the largest species of the genus, growing to a length of nearly two feet, and lays from 12 to 15 eggs.

THE SOUTHERN BLUE-TONGUE (*Tiliqua nigrolutea*) is the species commonly seen in the southern districts. It closely resembles the northern species, but is smaller, and brings forth its young alive. It is found in Tasmania and extends north into New South Wales.

THE BROAD-BANDED BLUE-TONGUE (*Tiliqua occipitalis*) is restricted to the Western District, and may be recognised by the series of broad, dark bands across the body and tail. It is also found in South and Western Australia.

Three species of *Egernia* occur in Victoria, of which the SPINY-TAILED EGERNIA (*Egernia cunninghami*) is the largest, measuring about 13 inches. It is widely spread over the State. The body-scales are keeled, those on the tail being provided with a sharp point. In colour this species is olive-brown, with scattered darker blotches. The young are speckled with light dots, which usually disappear in the adult.

Egernia striolata is a smaller species, usually found in rocky situations. A specimen kept in confinement gave birth to four young ones.

WHITE'S EGERNIA (*Egernia whitii*) is probably the commonest of all the Skinks, and is distributed over the whole of Australia, Tasmania, and adjacent islands. It is prettily marked, with a median line of olive-brown along the back, on each side of which is a broad, black band bearing a series of yellowish-white spots. The eyelids and ear-lobules are yellow. In length it is usually about 10 inches. It frequents all classes of country, but particularly that of a rocky nature, and is very quick in its movements.

There are altogether about 25 species of Skinks in Victoria. The species I have not dealt with are all small, and more than half the number are to be found within 30 miles of Melbourne.

The Orchids of Victoria

BY EDWARD E. PESCOTT, F.L.S., F.R.H.S.

PART VIII.

18. ORTHOCERAS, R.Br.

(Straight horn).

Dorsal sepal erect, incurved, hooded: lateral sepals narrow-linear, long, spreading: petals short, narrow, erect. Labellum recurved, 3-lobed, middle lobe larger, and longer, and contracted at base, a thick fleshy callus at base. Column very short, with lateral erect lobes not connected behind the anther. Anther erect or incurved, tapering to the apex, 2-celled. Pollen masses 2, bilobed, granular or mealy.

Terrestrial glabrous herbs, with an ovoid tuber, a few narrow leaves, which are radical, or nearly so. Flowers distant on short pedicels or pedicels absent.

This genus is limited to a single species, which also occurs in New Zealand, and is recorded there as *O. Solandri*, Lindl.

1. *O. STRICTUM*, R.Br. (upright). "Horned Orchid."

The plant has all of the characters of the genus as given above. Stem rigid, from 1 to 3 feet in height, having long ovoid tubers. Leaves 3 to 12 inches long, several, near the base, acute, sheathing, channelled. 1 or 2 long stem bracts. Flowers green or greenish brown, distant, erect, up to 8 on short pedicels, each protected by a long incurved sheathing bract, usually longer than the flower itself. Characters of sepals and petals, labellum and column as above; lateral lobes of the column often nearly as long as the petals.

The "Horned Orchid" is often very difficult to locate, as it usually grows among tall grasses and rushes, often in moist springy or clayey soils. Sometimes the stem is almost rigidly erect, especially before the flowers all open. Again the flower portion of the stem will be very curved, perhaps owing to the increasing weight of the flowers and ovaries. As the size of the ovary increases, the flower pushes itself well out from the protection of the long sheath. The two varieties, green and brown, may be found growing together.

The plant is recorded from all districts except the north-east: and also from Queensland, New South Wales, South Australia, Tasmania, and New Zealand. Flowers in early summer, November and December.

19. SPIRANTHES, Richard.

(Coiled flower).

Dorsal sepal and petals erect, concave, petals truncate, all forming a hood over the column. Lateral sepals free, ovate-lanceolate, erect or spreading. Labellum sessile, or nearly so, as long as the sepals, lower half embracing the column, undivided, tip recurved, lamina or disk with 2 rounded globular bodies or tubercles at base. Column erect, short; anther short, blunt, 2 celled. Pollen masses 4, in 2 pairs, granular or mealy. Flowers small, *spirally arranged* in a terminal spike. Terrestrial herbs, with fleshy, elongated underground tubers. Leaves narrow or linear, usually basal.

This is a notable genus, having usually small pink and white flowers, always spirally arranged on the stem. The genus is world-wide, but the species are not common. The single Australian species is recorded also from New Caledonia, New Zealand, tropical and temperate Asia, and also from some parts of Europe.

1. *S. AUSTRALIS*, Lindl. (Southern) "Austral Lady's Tresses."

The plant has all the characters of the genus; arising from several or many elongated thin tubers, which are not always annually reproduced. Plant from 6 to 24 inches high, leaves 3-4, 3 to 6 inches long, stem bracts 3. Spike spiral, dense or loose, flowers white or pink, or white and pink, sessile. Labellum usually white, as long as the sepals, somewhat rectangular, the tip often reflexed, truncate, margins beautifully fringed or glandular-dentate; base sessile, with an ovoid body or tubercle on each side.

This is a widely spread species, usually growing in marshes, swamps, or on wet stream banks. In colour it resembles *Erythraea australis*, R.Br., the "Austral Centaury"; and as both flower at the same time, the orchid may often be passed by. It often grows among rushes and sedges. The tuberous root system seems to be more or less permanent, new buds and crowns appearing alongside the parent plant, the new crown thus developing its own root system. It flowers in January-February, and is recorded from all districts of the State. It is recorded from all States except Western Australia, and is world wide as above mentioned.

Mr. Oakes Ames places this species as synonymous with, *S. Sinensis*, Ames.

20. CRYPTOSTYLIS, R.Br.

(Hidden Style or Column).

Flowers large, reversed on stem. Sepals and petals free, nearly similar, narrow linear or subulate, thin or membranous. Labellum conspicuously developed, thick, undivided, sessile, base enclosing the column, more or less contracted above the column, extended into a narrow or broad convex or concave lamina. Column exceedingly short, wide, the wings forming distinct auricles or connected into a membrane behind the anther, the margin toothed or fimbriated behind the anther. Anther erect behind the stigma, or bent forward over it, 2 celled, biconvex on the back, sessile, obtuse or shortly acuminate. Pollen masses 4, farinaceous.

Terrestrial glabrous herbs, with tuberous rhizomes, which are not always annually reproduced. Leaves few, radical, ovate to lanceolate, stems with 2 or 3 bracts. Flowers several in a terminal raceme, with usually green petals and sepals, and a large conspicuous, purplish or reddish brown or pink labellum.

The genus is represented in all the States, there being 18 known species. Four of these are Australian, and are all endemic. Two occur in this State. The other 14 come from Formosa, Malay, Papua, Philippines, New Caledonia, Fiji, and Samoa.

1. C. LONGIFOLIA, R.Br. (long-leaved) "Large Tongue-Orchid."

Slender, often tall, up to 2 feet in height; leaves 2 or 3 on rigid petioles, lanceolate, or oblong lanceolate, midrib prominent. Usually 2-3 bracts on stem. Flowers 3 to 8, sessile, reversed, with large conspicuous labellum, the perianth segments usually being light green; buds pointing upwards. Sepals and petals thin membranous, petals shorter, all rolled or folded so as to become subulate (awl-shaped), spreading, inconspicuous. Labellum about 1 inch long, very conspicuous, purplish or reddish purple, rarely purplish brown, nearly $\frac{1}{2}$ inch wide; margins sinuous towards base, which encloses or embraces the column: channelled around the tip, concave towards base, transversed down the centre by two raised somewhat beaded lines, often with two parallel ones, forming a double keel, terminating into a prominent, conspicuous reddish brown or purplish glandular process. There is also a central line approaching the column. The labellum depresses in the centre, and folds inward with age,

the flower slowly depressing and pointing downwards when dying.

This conspicuous species is often found in marshy slopes or heathy valleys, among rushes, sedges and grasses. It prefers a moist location or a moisture-retentive soil. It is often drawn in height, when growing in thick herbage. The long leaves may be mistaken for those of *Lyperanthus suaveolens*. But the leaves of this species are stalked, and often purplish on the back.

The plants flower in mid-summer, usually December to January: it is recorded from all parts of the State. It is also found in Queensland, New South Wales, South Australia and Tasmania.

2. *C. LEPTOCHILA*, F.v.M. (narrow-lip.) "Small Tongue-Orchid."

A more slender species than the preceding species, upwards of 1 foot in height, flowers smaller, more dense and closer together, 6 to 14; leaf ovate, on short petiole, larger than that of *C. longifolia*, often purplish underneath. Petals and sepals as in that species, but shorter and smaller. Labellum broad at base, clasping the column, pinkish or purplish pink, concave with margins much involute, distinctly *sickle-shaped*; a thick longitudinal raised plate along the centre of the broad base, followed by 2 rows of dark spots, which rarely become calli. Column wing with 2 broad denticulate lobes interrupted behind the anther.

This is a rare species in Victoria, and occurs in the South, chiefly in the Dandenong Ranges, where it was first collected by C. French, Jr., and also from Wilson's Promontory, in the E. It is readily distinguished from the preceding species by the smaller flowers, smaller sickle shaped labellum, and the larger and broader leaves. It flowers at the end of the year, having the same rooting habit as the previous species. Recorded also from New South Wales.

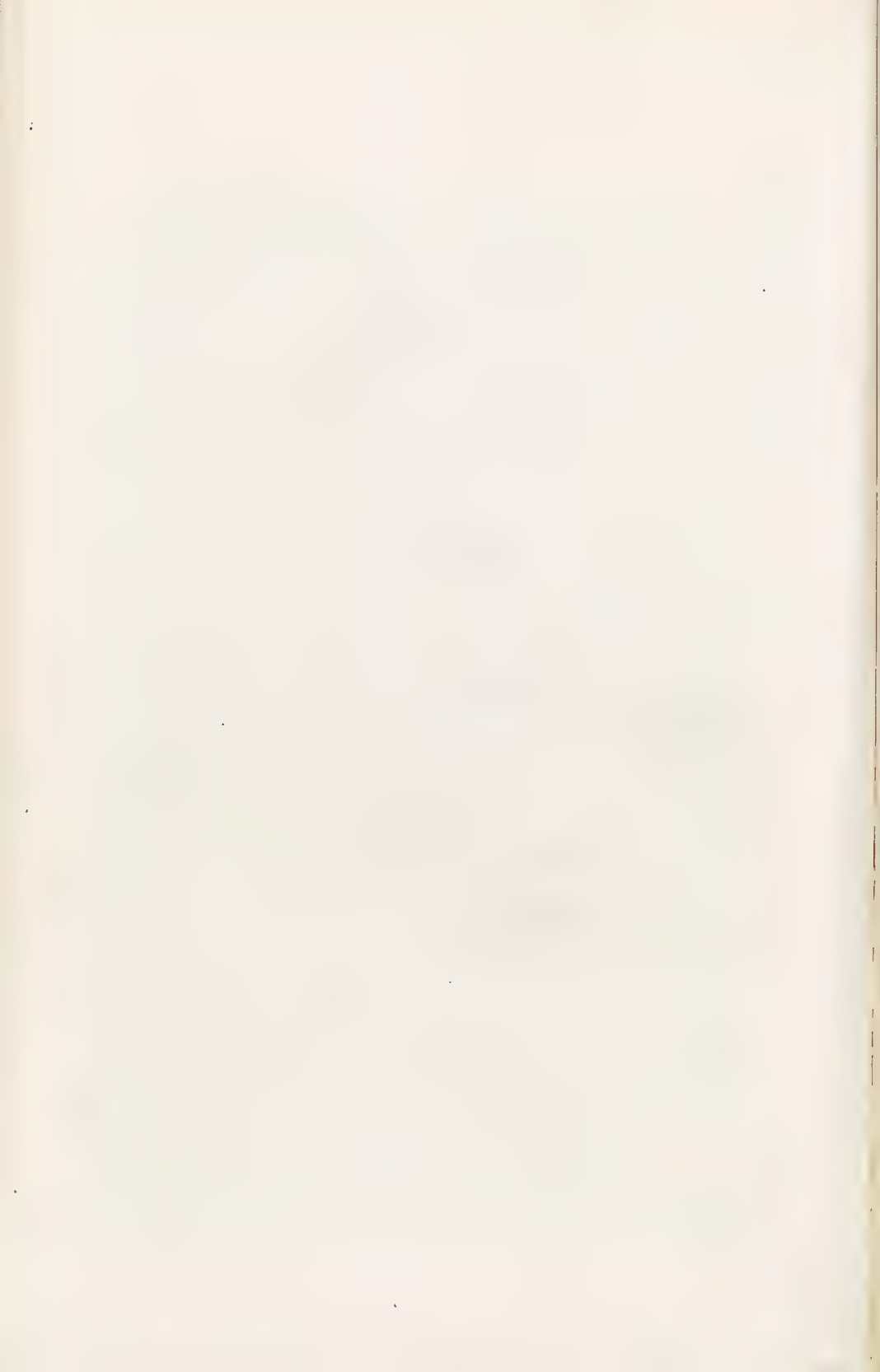
21. *PTEROSTYLIS*, R.Br.

(Winged style or column).

Dorsal sepal broad, erect, concave or incurved, forming, *united with the petals a hood* or galea over the column. Lateral sepals more or less united in an erect or recurved 2-lobed lower lip, in front of the galea, the lobes or ends frequently terminating in long points. Labellum on a short movable claw or hinge, often irritable, attached to the end of the basal projection of the column; variously shaped, oval, ovate, oblong, linear,



PTEROSTYLIS CUCULLATA, R.Br. Leafy Greenhood.



filiform or lanceolate, sometimes having long hairs; bearing at its base an appendage, either very short and obtuse, or longer linear, incurved, and forked or penicillate (hairy) at the end with a tuft of several cilia. Column elongate within the galea, and curved with it, with a pair of hatchet shaped or quadrangular wings one on each side of the rostellum and sometimes narrowly winged lower down, the base produced into a short horizontal projection or foot. Anther 2 celled: pollenia 4, powdery or granular free.

Terrestrial herbs, with round, naked, underground tubers, which are replaced annually, frequently increasing in additional numbers at the end of long white roots, or at the end of very short roots adjacent to the parent tubers. Leaves frequently in a radical rosette, sometimes linear and cauline; non-flowering or immature plants usually possessing leaves in a rosette or tuft. Flowers usually green or greenish, tinged or streaked with red or brown, purple or white. Large and solitary, or smaller and several in a raceme on short pedicels.

The genus is chiefly Australian; there are about 56 known species, of which 44 are Australian, most of these being endemic. It extends to New Zealand, New Caledonia and New Guinea. Commonly called "Greenhoods."

The Victorian species may be placed into two classes or sections, as follows:—Section 1: Lower lip erect, the lobes or their points embracing the galea, flowers solitary, or rarely multiple (except No. 21). Nos. 1 to 21. Section 2: Lower lip reflexed from the base against the ovary, lobes acuminate, or long and finely acute, or neither acute nor produced. Nos. 22 to 30.

For a series of line drawings illustrating all the Victorian species, reference may be made to four plates in "Literature" (17), by W. H. Nicholls.

1. *P. CONCINNA*, R.Br. (neat) "Trim Greenhood." Plant glabrous, slender, from 1 to 4 inches high. Leaves in a basal rosette, no stem leaves. Flower solitary, green with pale bands, and brown points. Galea incurved acuminate, tip acute, not lengthened. Lower lip erect, its lobes having a wide sinus, embracing the galea, very long and finely pointed. Labellum (see illustration) on a projecting claw, oblong, *very distinctly bifid* (notched, or two-fold). Column erect, upper angles of wings very acute.

The "trim" greenhood is quite a feature under the tea-

tree along the southern coast, occurring along Port Phillip Bay in colonies of thousands. The nick or notch in the labellum is its very distinguishing feature. Twin flowered specimens are exceedingly rare. This orchid has a wide range in the State, being recorded from all parts except the N.E. It is rather interesting to note that a species which thrives on the sea shore, sprinkled by the sea spray, should also be found in the far N.W.

It also occurs in Queensland, New South Wales, South Australia and Tasmania. Flowering season, winter; June to September.

2. P. TOVEYANA. Ewart and Sharman (after J. R. Tovey, a Victorian botanist). "Mentone Greenhood." Dwarf, under 6 inches in height. Leaves, ovate or ovate elongate, no basal rosette; *about 4 stem leaves clasping*, and one bract immediately below the ovary. Flower longer than No. 1, galea hooded not elongate, dorsal sepal subtended shortly to a fine point; lower lip with wide sinus, the points very long and finely pointed, clasping the galea in an upward direction. Flower green, with pale green stripes. Labellum longer than the column, narrower at top than base, *distinctly bifid*, but not so pronounced as in No. 1.

This rare orchid was first collected by C. French, Senr., in 1887, at "Gypsey Village," the old name for Sandringham. The specimen is in my herbarium. It was then classed with *P. reflexa*. J. R. Tovey found it for several years at Mentone. It has also been found at Frankston. L. Rodway records it as being fairly common in Tasmania.

Occuring in Victoria only along the coast at seaside resorts, it is unfortunately likely to become extinct. The stem, leaves and notched tongue are its distinguishing feature. It flowers in June.

3. P. CURTA, R.Br. (shortened, referring to the tips of the lateral sepals). "Blunt Greenhood."

Plant somewhat slender, glabrous, from 4 to 12 inches high. Leaves on long petioles, in a radical rosette, and having 2 loose stem bracts. Flower dull green, solitary, rarely 2-3 (see illustration). Galea large, broad, erect, *quite blunt at the tip*. Lower lip, broad, with wide sinus, short, hardly extending above the galea, *not finely pointed*. Labellum, red brown, linear, obtuse and entire, longer than the column, *twisted and slightly recurved*.

The blunt greenhood possesses somewhat a "squat" character; the large flower, with the broad blunt galea

and short lower lip are the chief characteristics. The tubers are annually renewed, with additional "juvenile" ones on long thread-like roots. It occurs in colonies, chiefly in open woodland, and is found in all parts of the State. It is found in all of the States except Western Australia. Flowers from August to October.

4. *P. NUTANS*, R.Br. (nodding). "Nodding Greenhood."

Plant slender, glabrous, 2 to 18 inches high, tall specimens uncommon. Leaves in basal rosette, oval or ovate, on long petioles, crenulate margins, 3 to 6. Stem bracts 2-3, the upper supporting the ovary. Flower solitary, rarely 2-3 on stem, *very much deflexed or nodding*, green, only slightly streaked. Galea terminating in an acute point, often slightly recurved. Lower lip erect, sinus broad, clasping the galea with narrow points just exceeding the galea. *Labellum* (see illustration) oblong-linear, blunt, *recurved* to almost a semi-circle, *projecting through the lower lip*, dull red, or greenish red, or green with a red brown central line, *pubescent (hairy)*. Column incurved, wings rounded at upper angles, broad, with a distinct tooth, lower lobes long and falcate, appendage curved, large, pectinate.

The nodding greenhood vies with the "fringed spider orchid," and the "wax-lip orchid" in being our commonest species. It has a distinction of its own, and is much sought for, although so common. It will often be found in grasslands in colonies of thousands. It multiplies very freely by increase of juvenile tubers, one plant often having 3 to 5 new tubers. Its nodding habit is almost unique amongst greenhoods. On one occasion, at Oakleigh, I found a plant with variegated foliage. This reproduced truly for several years.

It is found in all districts, and in all States except Western Australia. Flowers from July to October.

5. *P. ACUMINATA*, R.Br. "Pointed Greenhood.

Plant rather slender, from 6 to 12 inches high. Leaves in a radical rosette, long ovate, rather narrower than those of No. 4. Stem bracts usually 2, clasping, with one embracing the pedicel and ovary. Flower solitary, larger than No. 4, which it somewhat resembles, except that it is held upright instead of in a nodding position. *Galea erect*, incurved, and produced to a fine point, sloping outwards. Lower lip narrowed, with a somewhat narrow sinus (curve, fold, recess, or angle), points long lanceolate, produced to fine points embracing and passing

in length the galea. Labellum hairy, oblong linear, recurved, tapering to a point, produced through the lower lip. Lobes of column broad and obtuse, with a linear point at the front angle.

This is a very rare species, and although recorded from the N.W., S., N.E., and E., the records always refer to single or few specimens. I have only collected one specimen, and that from the Dandenong Range. It resembles *P. nutans*, except for its upright habit. It has a long flowering period, specimens having been collected from autumn to early summer. It is often taken for a hybrid between *P. nutans* and *P. curta*, but it more resembles the former species. Recorded also from New South Wales and Queensland.

6. *P. NANA*, R.Br. (dwarf). "Dwarf Greenhood."

Plant quite dwarf, from 1 to 4 inches high, slender. Leaves in a radical rosette, small, elliptical, 4-6. One or more stem bracts, clasping. Flower quite small, solitary, *pale green*; stem quite upright. Galea erect, long, pointed at tip. Lower lip erect, long, with wide sinus, points embracing the galea quite long and finely pointed, *a small inflexed tooth in the centre*. Labellum oblong, with a blunt tip, and a central brown line, as long as column. Wings of column with a small upper lobe or tooth; lower lobe oblong and obtuse. Labellum somewhat pubescent, a few hairs also on lower lobes of wings.

This diminutive species is found in all parts of the State, from exposed open situations on sea-cliffs to the far inland tree and grasslands. It is to be found in all classes of country, open and wooded. Its pale yellowish green flowers are easily noticed. It is recorded from all States except Queensland, and flowers from July to October.

7. *P. PEDOGLOSSA*, Fitz. (Syn. *P. PEDALOGLOSSA*.) (foot-like tongue or labellum). "Tailed Greenhood."

Plant slender, fragile, dwarf, leaves rosulate (rosette-form), usually 3-5, with an additional one on the stem above the rosette, 2-5 inches high. One stem bract supporting the pedicel. Flower small, pale green, with darker broadish streaks; galea much reflexed in upper half, the dorsal sepal subtending to a *long filiform point*, pointing outwards. Lower lip opening to a wide sinus, with very *long filiform—almost setular* (bristle-like) *points*, embracing the galea and *very far exceeding it*. Labellum short ovate, or rounded ovate, glabrous.

This distinctive greenhood is readily distinguished by its three long thread-like "tails." It usually grows among shrubs, frequently at the base of *Melaleuca squarrosa*, where it occurs in colonies. It is somewhat rare in regard to distribution, but it multiplies freely, and thus numbers are often found growing together. It flowers from March to July, and is recorded only from the South. It is also found in New South Wales and Tasmania.

8. *P. PEDUNCULATA*, R.Br. (peduncled or stalked). "Maroon Hood."

Plant slender, often tall, from 4 to 12 inches high, tall specimens usually being "drawn" in shade. Leaves ovate in basal rosette 4-6, on long petioles, with 2 or 3 stem bracts. Flower solitary, green, very much flushed with *maroon-brown colourings*. Galea erect, flexed horizontally, with a short acute tip. Lower lip erect, rather broad, with an acute sinus, the very long points embracing and far exceeding the galea. Labellum oblong or ovate, very blunt or obtuse; dark purplish brown, shorter than the column, with raised central line; basal *appendage almost trifid* (three-divided), not hairy. Column erect purplish brown on sides and at top, *upper angle of wings produced into a long sharp point*; lower lobes broad and obtuse, somewhat ciliate on the inturned margin.

Maroon hood is very aptly named. No other "greenhood" is so coloured, and it is therefore easy of determination. It is fairly common, more often being found in bush, or gully country. It is recorded from all parts except the N.W., and also from New South Wales, South Australia, and Tasmania. It flowers from July to October.

9. *P. GRACILIS*, Nicholls (graceful). "Graceful Greenhood."

The following description, abridged, is taken from the author's published record.

Plant slender, glabrous, from 4 to 12 inches high. *Stem leaves* 2-3, oblong lanceolate, *often large*, petioles slender, margins often crenulate. Stem bracts 3-4, sessile, acuminate, clasping. *Flower small*, solitary, green, apex of galea brownish. Galea erect, gradually incurved, shortly acuminate. Lower lip erect narrow, cuneate, lobes produced into long filiform points, far embracing the galea. Labellum large, oblong-elliptical, projecting, much decurved. Column shorter than labellum,

upper lobes of wings toothed, lower lobes narrow, obtuse, with inner margins ciliate.

I have not seen living specimens of this newly published species, which is very distinct, and is well named "graceful." The large leaves and the comparatively small flower are quite distinctive. It might appear to be somewhat like *P. alpina*, or even *P. pedunculata*. But its distinctive labellum and column are outstanding.

There is a specimen of this orchid unnamed in the Melbourne National Herbarium, collected by C. French, Jr., in the Dandenong Ranges over 30 years ago. It is recorded only from the South, and also from several localities in Tasmania, flowering from August to October.

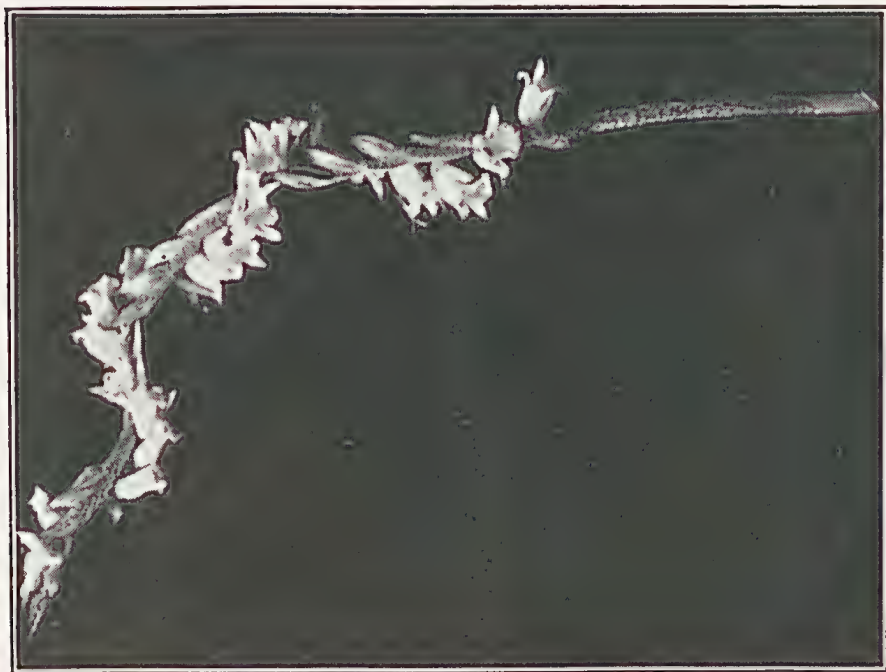
10. *P. CUCULLATA*, R.Br. (hooded). "Leafy Greenhood."

Plant robust, glabrous, usually stout and dwarfed, from 2 to 9 inches high. Leaves crowded at base, almost sessile, large, oblong or obovate, passing into leafy bracts on elongated specimens, the upper one almost enveloping the flower. *Flower quite large*, solitary, generally two shades of green, with chocolate markings on petals and lower lip; somewhat glandular pubescent, iridescent in the sun. Galea large, recurved only at upper portion, somewhat blunt, or with a short decurved tip. Lower lip erect, broad, with wide acute sinus, the broad lobes embracing and curved over the galea, but hardly exceeding it. Labellum long linear or narrow elliptical, channelled, with central raised line, tip blunt, appendage densely pencillate. Column erect, upper margins with short pointed tooth; lower lobe oblong, with broad blunt tip.

This species is easily distinguished by its somewhat squat, large flower, enveloped in the leafy bract, and is our largest flowered species. It is not common; and was lost to Victorian collectors for thirty years. It is only recorded from the South, from Broadmeadows, Western Port, Point Lonsdale, Dandenong Ranges, and a few other similar localities. During the "lost" period, the orchid now known as *P. falcata* was discovered and confused with *P. cucullata*, being given that name. Then *P. cucullata* was after some years, re-discovered, and named by Baron von Mueller as *P. Mackibbini*. In 1915, Dr. Rogers unravelled the tangled skein, and placed these all in their right position, the last named being placed as a Synonym with *P. cucullata*.

It is also recorded for South Australia and Tasmania, and flowers in September-October.

Plate XXI.



SPIRANTHES AUSTRALIS, Lindl.
Austral Lady's Tresses.



PTEROSTYLIS FALCATA, Rogers.
Sickle Greenhood.



11. *P. FALCATA*, Rogers (sickle shaped). "Sickle Orchid."

Plant robust but slender, from 5 to 12 inches high. Basal leaves large, 3 to 5, only rosulate when plant is young. Leaves ovate-lanceolate, sessile. Stem bracts 2 to 3, sheathing, upper one not usually close to ovary, but occasionally so before flower fully opens. Flower solitary, glabrous, very large, sometimes in two shades of green, varying to green and dull purplish. Galea erect, very large, quite sickle-shaped, acuminate, with long outspreading point. Lower lip wide, with wide sinus, produced into very long caudae or tails, embracing the galea, and far exceeding it, often standing erect, and often recurved to sickle-shape. Labellum much longer than the column, curved forward, coming through the sinus broad in centre, and bluntly narrowed at the tip; appendage densely pencillate. Column shorter than labellum, upper lobe toothed, lower lobe roundly obtuse, both lobes ciliated.

This is our second largest species, rare in some places, common in others. On one occasion at the Dandenong Creek, I found colonies of many hundreds, including one albino flower. It is usually found in damp or moist situations. In shade, specimens will be considerably drawn. It is recorded from all parts except the North-West, and also from Tasmania. It flowers from September to January.

ENTOMOLOGISTS' CLUB.

Melbourne entomologists, including several members of the Field Naturalists' Club, have formed a club with the object of popularising their favorite branch of natural history, and encouraging systematic work and the study of life histories. Meetings will be held at members' houses. The Entomologists' Club will be conducted on the lines of the Bird Observers' Club, recently revived, and will not trespass upon our own society's province.

Mr. F. E. Wilson, who presided at the inaugural meeting of the Entomologists' Club, in a brief address, referred to the need for more workers, both collectors and students of insects, in Victoria. "The field," he remarked, "is unlimited, and the toilers in it are few. With the exception of Lepidoptera and Coleoptera, very little systematic collecting has been done in our State, and it is very desirable that we should have enthusiastic collectors in those large Orders, the Diptera, Neuroptera, Hymenoptera, and Hemiptera. One group of insects that is urgently in need of attention is the Aphaniptera. The indigenous species of fleas have as hosts our rapidly vanishing marsupials."

Mr. Wilson mentioned Hemiptera as a greatly neglected Order, of deep interest. In examining mosses, tussocks, and leaf debris, for minute beetles he found many delightful little species of Hemiptera that would otherwise have escaped detection. There was still a great amount of work to be done among the moths; and the study of the life histories of insects of all the Orders offered a vast field of activity for many workers.

FURTHER NOTES ON VICTORIAN CHITONS.

BY EDWIN ASHBY, F.L.S.

Corrections and Additions to the "Locality List of Victorian Chitons," published in the *Victorian Naturalist*, May, 1926.

Ischnoradsia australis evanida, Sowerby: On page 9, 13th line from the bottom, insert the name "*australis*" between *Ischnoradsia* and *evanida*. The form *evanida* can only be considered a sub-species of *australis*. Also, in the "Locality List," insert "*Ischnoradsia australis evanida*, Sow. all coasts," between the genus *Callistochiton* and the subgenus *Heterozona*. This entry was included in the original draft, but through an oversight was omitted.

Ischnochiton iredalei, Dupuis: Through an oversight of the writer's, "*pallens*, Rv." is twice printed in place of "*Ischnochiton pallidus*, Rv." both at bottom of plate I, fig. i., and in the 9th line from the bottom, page 15. The writer has discussed with Messrs. J. H. Gatliff and C. J. Gabriel, the advisability or otherwise, of retaining the name of Reeve's *Chiton pallidus* for this shell. On the following grounds we have decided not to accept the name "*pallidus*," but to return to the name *I. iredalei*, Dupuis. The type of Reeve's *pallidus* is worn smooth, the description is consequently ineffective, and the locality is unknown. While I am still of the opinion that Reeve's type is probably a worn example of *I. iredalei*, Dupuis, the accuracy of such an identification can only be determined, if at all, by disarticulation of the type, which may or may not reveal sufficient existing sculpture for determination.

I concur with the gentleman named in rejecting identifications founded upon mere opinions, without the support of adequate data. On these grounds I retract my identification and agree to consider *Chiton pallidus* of Reeve as non-Australian, until such time as additional data may disprove this course. We therefore revive the name *I. iredalei*, Dupuis, which is published in Pt. I, hereof as a synonym only. Iredale and Hull adopted the name *I. lineolatus* for this shell, but it is not the *Chiton lineolatus* of Blainville; for synonymy see Ashby, *Trans. Roy. Soc. S.Aust.*, Vol. xlviii., 1924, p. 329.

Ischnochiton atkinsoni, I. and May: On page 15, substitute "syn" for "var" before the word *lincolniensis*. For explanation see Ashby, *P. and P. Roy. Soc., Tas.*, Feb. 10th, 1927, pp. 111 and 112.

Ischnochiton versicolor, Sowerby. *Syn. I. proteus*, Rv.: On page 15, the 14th line from the bottom, must be altered thus, because, since the publication of my paper, I have, with Messrs. Gatliff and Gabriel, compared Sowerby's figs. (*Mag. Nat. Hist.*, iv., 1840, p. 292, figs. 75 and 122), with examples of *I. proteus*, Rv. We concur with Iredale and Hull in considering them conspecific. On February 17th last I collected this species, in large numbers, at Portland. Some examples measured 40 mm. and more in length; most represented the variety called *milligani*, with closely packed ribs in the lateral areas.

Ischnochiton decussatus, Rv.: On page 15, line 11 from the bottom, *I. decussatus*, Rv., is given as a synonym of *I. contractus*, Rv. In "Notes on the Types of Australian Polyplacophora in the British Museum" (*Trans. Roy. Soc., S.Austr.*, Vol. xlviii., 1924, p. 328), referring to the type of *I. decussatus*, Rv., I say: "This is the shell we used to know under this name in South Australia, but now known under the name *I. contractus*, Rv., this latter was described as having solitary granules in the lateral areas (sic. disjunct); this character is so distinctive that one is compelled to concur with Iredale in considering Reeve's two species as con-

speciñc, *contractus* having page precedence." Thus there is not the slightest doubt that Reeve's *Chiton decussatus* is our shell.

Messrs. Gatliff and Gabriel have pointed out that, in the absence of the type of *contractus*, the mere statement that it has "solitary granules," is not a sufficient ground for its identification with our shell, for the rest of the description is very defective, the figure given by Reeve is not at all like our species in shape, and the habitat is unknown. In conference with these gentlemen, I have agreed to disallow the name *contractus*, considering that it is not an Australian species.

Ischnochiton ptychius, Pilsbry. While, in my previous paper, I queried its identification on a single specimen, Mr. Gabriel has kindly shown me the example of this species referred to, which was collected by the late W. H. Dillon, at Portland, and I now have pleasure in stating that it certainly is *I. ptychius*. On February 17 last, I collected the second known Victorian example at Portland.

Genus *Stenochiton*: On page 15 the prefix "sub" before genus *Stenochiton* should be deleted. I proposed (*Trans. Roy. Soc., S.Aust.*, Vol. xlii., 1918), the elevation of *Stenochiton* to full generic rank on external and internal grounds, but in face of the number of new genera proposed by Iredale and Hull, many of which, in my opinion, are at present unsupported by any true generic definitions, preferred to treat it as a subgenus only, until I had re-examined the grounds given for its elevation. I now confirm my opinion, and consider that the multi-slitting of the insertion plates, common to most species, together with the specialised characters of the shell, justify full generic rank. It would be best placed immediately following the subgenus *Heterozona*.

Callostochiton mawlei, I. and May: Add this species to the Victorian fauna. Mr. Gabriel has shown to me examples in his collection, from Portland, which certainly are referable to this species, hitherto considered peculiarly a Tasmanian form. In further confirmation, I collected four examples of the same rare species at Cape Northumberland, S.A., not far from the Victorian border.

Iredale records odd valves, dredged in 5-20 fms. by Roy Bell, at Port Fairy (*Proc. Lin. Soc., N.S.W.*, Vol. XLIX., pt. 3, p. 214, 1924). Messrs. Gatliff and Gabriel have called my attention to the fact that *C. mawlei* corresponds with Reeve's figures and description of his *C. antiquus*, the name hitherto applied to the Sydney shell, which certainly does not so well correspond with Reeve's figures; I concur with them in this, and am taking steps to settle the question by comparison with the type. In 1922 I compared Reeve's cotypes with *C. meridionalis*, and considered that they were the Sydney shell, owing to the parallel character of the longitudinal sculpture, a feature which equally applies to *C. mawlei*. Both the Sydney shell and *C. meridionalis* show only net-work sculpture in the dorsal area, whereas *C. mawlei* continues the ribbing right over this area. Reeve's figures clearly show this ribbing, and Pilsbry's figures do not. Assuming that the proposed examination confirms this position, the shell now known as *C. mawlei*, Iredale and May, will be *C. antiquus*, Rv., non of Pilsbry auct. Synonym *C. mawlei*, I. and May. The Sydney shell will then require a name, which I suggest be *C. Gatliffi*, in honor of my friend to whom we are chiefly indebted for the correction of this error. The distinguishing characters are described by myself (*Trans. R.Soc., S.Austr.*, Vol. VLIII., p. 400, 1919), that description, with fig. 6. pl. xlii., will then form the type description. In that paper I treated *C. meridionalis* as a subsp. of the Sydney shell, but in a subsequent paper considered them specifi-

cally distinct.

Memo.—Iredale and Hull include Victoria under the heading, Habitat, for *Lepidopleurus (Terenochiton) matthewsonianus*, Bed, and *Chiton (Rhyssoplax) oruktus*, Maughan, but they supply no data and give no reference. Up to the present, I have not seen a Victorian example of either, neither have I seen a published record. While I am confident that both these will be found in that state, I do not feel at liberty to anticipate the discovery, unless supported by some data.

The following is a list of some of the species collected by me in February last, at the localities named:—

Lepidopleurus badius, H. and H., *L. liratus*, Ad. and Ang., *Acanthochiton granostriatus*, Pils., *A. variabilis*, Ad. and Ang., all at Portland. *A. Kimbri*, Torr, one dry example measures 18 x 7 mm.; in life it was twice the size or more, and the broad girdle beautifully flecked all over in red, Port Fairy; *Ischnochiton decussatus*, C. Rv., non *contractus*, Rv., Portland. *I. virgatus*, Rv., very numerous and fine, at Portland. *I. thomasi*, Bed., Portland. *I. (Heterozona) cariosus*, Pils., Portland. *Ischnoradsia australis evanida*, Sow., very numerous and large, Portland. *Chiton (Rhyssoplax) jugosus*, Gld., Port Fairy and Portland. *C.r. caliozona*, Pils., Portland.

PAST AND PRESENT.

As we grow older we become reminiscent; we try to warn our young friends, out of life's experience. We ask them to preserve many natural beauties, but thinking that supplies are inexhaustible, they do not spare, feeling sure that they can find their treasures, whenever they want them again.

As a lad, my father used to take me to Mt. Macedon, a favourite tourist's resort: we could not travel by train, then from Melbourne to Lilydale, Healesville, Warburton, or Fern Tree Gully. It was at Macedon that I shot my first Koala. There, also, with great pride I brought back to our boarding-house home, my bag of birds, and was read a never-forgotten lesson on my cruelty, by a well-known and kind-hearted fellow tourist, named Crosby. Many years ago I gave up pot-hunting or shooting. Shooting at birds and small animals I try hard to get boys to avoid.

Half-way between the Macedon railway station and Upper Macedon, are the Waterfalls, with a creek once overgrown with, and abounding in ferns of many species. There I received my first lesson, as a boy, from a Field Naturalist, and copied, at his dictation, names that have since given me so much pleasure. I have often wondered who he was, that slight man, who walked to the Camel's Hump with his carpet-bag over his shoulder, collecting ferns. Koalas and ferns have long since disappeared from the creek surroundings. Some time ago, I failed to find one fern on the creek banks.

A little more than 35 years ago, at a picnic, I found the small Rasp Fern in abundance, lining the Dandenong Creek, near Dandenong township. At a more recent date I searched diligently thereabouts, but could not get a specimen. I had not realised that time, or people, had ruthlessly rooted out the ferns. Again, when in my early teens, I used to go shooting to the Tarago, a river towards Neerim, and in the Main Street of Drouin saw, for the first time, the pink young fronds of the Gristle Fern. Since writing my notes on the bipinnate form of the Fishbone Fern, I have learned from Messrs. St. John and C. French, Senr., that this variety of the species was found fairly numerous in the year lang syne. To-day you will find the form only rarely in Victoria.—A.J.T.

NOTES ON NEWTS (CAUDATA).

BY H. W. DAVEY, F.E.S.

(*Read before the Field Naturalists' Club of Victoria,
March 14, 1927.*)

In March, 1913, I received a number of newts, *Molge pyrrhogaster*, from Japan, and in January, 1915, exhibited some of them at a meeting of this Club. To-night I am showing some of the same, living, specimens. None of the newts died while in my possession, but several that were given to friends, at different times, did so shortly after their change of "habitat."

The Northern Hemisphere is the home of the newts and salamanders, 120 species being found there, while in the Southern Hemisphere, only a few species occur; none is found in Australasia. In China and Japan the maximum size of the Caudata is reached; there is found the Giant Salamander *Megalobatrachus maximus*, which grows to a length of five feet. I once saw a very fine living specimen of this gigantic newt, at the Zoological Gardens, at Regents Park, London. These newts feed mostly on fish, which, of course, are swallowed whole. All the Caudata are harmless to man, but several species exude poisonous secretions from glands in their skin.

I have seen one of our large Bell-frogs, *Hyla aurea*, die a few minutes after it had accidentally jumped on to the back of a Japanese newt that happened to be out of the water. Fright, probably, caused the newt to exude a fluid that was rapidly fatal to the frog.

Further evidence of the poisonous nature of these secretions was obtained when some examples of the large Warty Newt, *Molge cristatus*, arrived from England. A cat, in an unguarded moment, lifted one of the newts out of the water with its claws, and then severely bit it, for which foolishness it suffered great distress, and was violently sick afterwards.

The Spotted Salamander, *Salamandra maculosa*, attains a length of nine inches, and is a very pretty species. When in perfect condition it is intensely black, and ornamented with large, bright-yellow spots. The colour combination is one of Nature's warnings, this species exuding secretions of a highly poisonous nature. The Japanese newt also has the warning coloration, viz., fiery red.

Newts, under favorable conditions, are extremely long-lived. There is a record of a Giant Salamander having

lived in an aquarium for more than 50 years. The newts exhibited to-night I have had in captivity for fourteen years, and it is highly probable that many of them were of a considerable age when they were captured in Japan. It is surprising that not one in my collection appears to be falling into the sere and yellow of life. They feed well; and every spring the males assume the gay coloration so typical of newts in the breeding season. The females also lay fertile eggs each season, which they also as regularly devour, when allowed to do so.

Development of these newts appears to be slower than is that of the European species. The latter reach maturity in three years, usually. I once reared a series of that fine Spanish newt, *Molge waltli*, and, although their growth was very rapid during the first year, they were not mature until three years old.

In a paper read before this Club in January, 1915 (see *Victorian Naturalist*, Vol. 31, p. 137), I mentioned an instance of limb-reproduction that had come under my notice. Two years ago, when I was transferring some of my newts to an aquarium, temporarily, one dropped from a pot of *Valisneria spiralis* on to the ground, without being noticed. On turning round, I trod on it, crushing it so badly that I at first thought it was dead. Three parts of its tail had been completely crushed off, and one side of its head injured considerably. I put it aside, but some time afterwards noticed it moving, so I placed it under a piece of bark near the water; but looking under the bark later, found that it had entered the water. Thinking that, having lost so much of its tail, the newt would be unable to reach the surface for air, I again placed it under the bark, but once more it returned to the water. Its head was in shape, and it appeared to be perfectly well next day, excepting that it had great difficulty in reaching the surface of the water. The stump of the tail soon healed, and gradually a new and perfect tail was developed.

In a letter received from Mr. W. W. Froggatt, F.L.S., Entomologist to the Forest Commission, N.S.W., occurs the following passage:—"I have been collecting gall-making thrips for the last few years, and now have an expert in California, Dudley Moulton, describing the new species for me in our *Linnean Society*, N.S.W. They have some very curious habits. The gravid females of one we obtained from *Gildandra*, had the abdomen swollen like that of a queen white ant (Termite), and was the sole mother to a gall containing a thousand active larvae."—C.D.

EXCURSION TO ELTHAM.

About 25 members and friends took part in the excursion to Eltham on February 19th. The weather was unfavorable—dull and windy, with showers; but we had a pleasant ramble to the banks of the Yarra. Several Eucalypts, hosts to clumps of mistletoe, *Loranthus pendulus*, were stripped of bark in the search for pupae of the Mistletoe Blue, *Ogyris olane*; but only one pupa was discovered. The larva of this Lycaenid is one of the few blues that are not attended by ants. On the foliage of an acacia, gregarious larvae of the Imperial Blue, *Ialmenus evagoroas*, were found; also pupae. Small black ants were swarming over them.

Among butterflies captured were *Heteronympha merope*, *H. philerope*, *Xenica klugi*, and *Zizina labradus*. Sixteen species of birds were noted, Mr. Hanks making the list.—C. H. BORCH.

EXCURSION TO KILLARA.

A richly fossiliferous outcrop of Silurian mudstone, on Mr. J. H. Syme's property at Killara, Upper Yarra, was visited on February 26th by about 24 members and friends. At Killara railway station we were met by Mr. T. C. Bowie, manager of the estate.

On the short walk to our destination, Mr. Bowie pointed out an excavation in ironstone which, so far as he knew, was the only occurrence of such a rock in the district. A little investigation with eyes and hammers soon showed evidence of drifted wood embedded in the rock. Although a careful search was made for any casts of marine fossils, none was found. Altogether, the appearance of the material suggests a lagoon accumulation, perhaps not far from the sea. The rock, moreover, is very similar to another ironstone, which I recently found near Cave Hill, Lilydale, and which may be associated with the older basalt. Mr. Bowie did not know of any basaltic occurrence in the district, but extensive denudation may have accounted for its absence here. On looking up the original series of fossil specimens collected by the Victorian Geological Survey, in the fifties of last century, and now in the National Museum, I found a specimen of fossil wood, from an ironstone bed at Woori Yallock (B 23), close by, which I had determined by a microscopic examination, some years ago, as probably coniferous.

We soon arrived at our destination, where the mudstone, belonging to the newer division of the Silurian (Yeringian), is seen in a drive put into a rising bank. Among the fragments of rock thrown out, we commenced to search, and soon collecting bags contained many specimens—trilobites, lamp-shells, corals, and snails of a long departed sea fauna. Among the corals were found the rugose, simple form, *Lindstroemia*, and the epizoic, tabulate *Pleurodictyum*, which had a habit of fastening itself, in an annoying way, to the stem of a sea-lily. Remains of sea-lilies were abundant, but only the stems were represented. Their articulated joints show a wonderful radial pattern, and sometimes the central gut was seen as a stick-like cast projecting from the middle of the plate. In one case a coiled arm of a probable *Herpetocrinus* was found.

Of lamp-shells there was practically no end to the number of kinds. Those identified were:—*Atrypa reticularis*, *Camarotoechia* spp., *Chonetes* sp. nov., *Cyrtina* sp., *Leptaena rhomboidalis*, *Nucleospira australis*, *Orthis testudinaria*, *Spirifer lilydalensis*, *Stropheodonta lilydalensis*, and *Strophonella euglyphoides*. Bivalved shells were fairly common, and more than usually interesting. Thus there was the elegant *Palaeoncoilo raricostae*, with its striking taxodont or toothed hinge-line, the curiously angulated *Goniophora australis*, a fragment of the large pearl-mussel-like *Leioptera*, and the buttressed *Cucullella*.

The sea-snails included the slit-band snail, *Pleurotomaria maccoyi*, and the remarkable air-breathing snail, *Hercynella*, which has been described at some length by the leader in *Proc. Roy. Soc.*, *Vict.*, Vol. XXIX., 1917, pp. 123-126. A fine specimen of *Hercynella victoriae* was found by one of the members at this excursion. Among others of the gasteropods, quite an interesting series of sea-butterflies were found, such as a fine specimen of *Comularia*, a *Tentaculites*, with its small needle-shaped and transversely ribbed shell, *Hyolithes*, which generally carries a lid to the orifice, and the worm-like *Coelolus*, common to Australia and North America. Among the cephalopods were noted, *Kionoceras*, *Cycloceras* and *Orthoceras*.

The trilobites, perhaps, excited the most interest. Numerous head-shields of *Phacops*, and several compound eyes of the same form were discovered. This genus has about 200 to 300 facets on each eye. The allied genus *Dalmanites*, was represented by one or two fine tail-pieces or pygidia. Other kinds of trilobites found were *Cheirurus*, *Calymene*, which could roll itself up like a woodlouse, a head of *Cyphaspis*, probably *C. lilydalensis*, and portions of the spinose *Acidaspis*. Other crustaceans represented were numerous little water-fleas, or ostracods, *Beyrichia wooriyallockensis*, and a species of a eurypterid or sea-scorpion. The ostracod, which here occurred in myriads, is also interesting from the fact that the leader named it in 1902, from specimens, now in the Museum, obtained a stone's throw from this place. Not the least interesting finds were some woody fragments in these Silurian rocks, taking us back to the very beginning of the land plant flora.

Our thanks must be accorded to Mr. Bowie for providing the party with hot water and afternoon tea and giving us the facilities for commemorating our visit to the spot by the planting of a *Tristania* by the leader. The idea originated with our Vice-President, Mr. P. R. H. St. John, who brought the tree from the Botanic Gardens. We are also indebted to Mr. H. R. Syme, who, however, was unable to be present, to act as co-leader. The locality is beautifully situated on the rich lands at the junction of the River Yarra with the Woori Yallock Creek; and with the uplands of the Steele Range opposite, there could be no more enjoyable surroundings.—F. CHAPMAN.



SWIFTS AT Warburton.

Early one morning in January last, a very large number of Swifts, *Hirundapus caudacutus*, was observed, congregated round the summit of Ben Cairn. My companions and I agreed that there must have been at least 1,000 of these graceful birds soaring and wheeling round the summit of the mountain and out over the valley. Was the gathering a preliminary to the long migratory journey northwards? Insect life apparently was abundant, and many of the birds were plunging at intervals into the bushy ends of branches of some tall Eucalypts. Hovering, the birds would capture insects and launch into space again.

There were many good vantage places for perching, and we were quite satisfied that, on at least two occasions, two birds did perch for a brief period. While I was watching a dead gum tree, possibly 50 yards distant, a Swift flew to the topmost branch, which was nearly horizontal, hesitated, and then alighted, holding its wings quite still and almost folded. It remained thus for about a second, certainly not with the object of getting an insect, as its head did not move. The second bird to perch was seen by five members of our party. It flew to the end of a leafy branch and alighted, clinging, wings stationary, in a half sideways position, for about two seconds. Though only two birds alighted, dozens threw themselves on to the branch tips, wings hovering, as they snapped up insects.

Sitting on the rocks, it was delightful to watch the aerial evolutions of such a vast number of birds. Once or twice, so thickly did they gather, they resembled nothing so much as a great swarm of bees on the wing. Some were seen to hover, motionless, excepting the wings, for a time, but most of them were constantly sweeping round the summit and out over the valleys. Loud whirring, rushing sounds were heard, as they swept past at tremendous speed. This lasted from 8 a.m. until about 8.30 a.m. The notes of a few birds were rather pleasing, calling to mind the sweet, restrained song of the Welcome Swallow.—C. H. BORCH.

GROWTH IN *LYGODIUM*.

"Climbing maiden-hair" ferns are, perhaps, rare in cultivation, yet they are very charming plants, and, once established, grow luxuriantly. My first attempt to add *Lygodium scandens*, Sw., to my fern community, failed: the young plant, received from a New South Wales botanist, familiar with *Lygodium* in its haunts, soon perished. A successor has survived, though one of its two tender shoots withered, and the other lost its unfurling bud.

About a fortnight after the "accident," a new bud, no bigger than a pin-head, and "furry," appeared in an axillary position,

and was examined daily. This mode of regeneration, as it were, was interesting. The bud developed into a vigorous shoot, and now, a month later, my *Lygodium* is proving that its specific name is well deserved: the little fern is climbing steadily; and next year may rival in beauty its neighbours, true maiden-hair ferns, including *Adiantum formosum*.

Professor F. O. Bower, in his great work on "The Ferns," has a chapter on the morphological analysis of the shoot system of these fascinating plants, and refers to *Lygodium* and other genera with which we are familiar. He states: that the *axillary position* of buds is not uncommon, and it is found in some of the most archaic types. Among living ferns, it is best seen in the Hymenophyllaceae, and has been shown also to occur in the Ophioglossaceae. (*The Ferns* (Filicales), I, p. 70).

Interest in Victorian ferns has been stimulated by Mr. H. B. Williamson's excellent series of papers in the *Naturalist*. Those who, like myself, have long delighted in the grace and beauty of ferns, while lacking botanical knowledge, are able now to identify many species, and have learned more than their names. I hope that Mr. Williamson will contribute soon, illustrated articles on our water plants—they are not less interesting than the Filicales.—C.B.

KANGAROO FIGURES ON COINS.

English tradesmen's tokens of the seventeenth and eighteenth centuries are interesting to the naturalist as well as to the coin collector, and numismatist. At least, some of them are, because animals figure in the designs. A "Zoo" series might be selected from the hundreds of pieces that were issued by traders and tavern-keepers to make up the deficiency in supplies of small change, in the course of two centuries.

A token in my collection, has on the obverse figures of a kangaroo, an armadillo, and a rhinoceros. It was issued in 1795, by T. Hall, City Road, London, who describes himself, in an inscription on the token, as "The first artist in Europe for Preserving Birds, Beasts, etc." The portrait of our national mammal on this old English token is, apparently, copied from a figure in one of the early "Voyages"; it is quaint, for the animal is rather like a large rat, sitting half erect on its hind legs, with the head turned towards a tail, which is tilted as a blue wren holds its tail usually. Much closer to nature is the figure of a kangaroo on the famous Tasmanian shilling, issued by Macintosh and Degraives in 1823.

Again, on the Tasmanian shilling of 1825, our marsupial appears, This is an exceedingly rare coin; one was sold recently, in London, for £25, Mr. A. Chitty, the noted Melbourne numismatist, informs me, in sending some notes regarding "kangaroo" coins. On the obverse of all the Port Phillip gold pieces a kangaroo is shown facing to the right below the date, 1853. These pieces, also, are great rarities.

Many other early Australian pieces bear kangaroo's portrait; while, of course, it figures with the emu on our current coinage, in the coat of arms.—C.B.

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EXCURSIONS.

EASTER EXCURSION, APRIL 15th to 19th.—Toolangi. Object: General. Leader: Mr. A. E. Keep. Meet at Flinders Street Station on 14th for 5 p.m. train to Yarra Glen, thence coach to Toolangi. Members of party travelling by this or Friday morning train are advised to communicate with Mr. Bath, Coach Proprietor, Yarra Glen, to reserve seats.

SATURDAY, APRIL 23rd.—Cockatoo. Object: Mosses. Leader: Mr. J. R. Leslie. Meet at Flinders Street Station in time for 9.10 a.m. train. Lunch to be taken.

MONDAY, APRIL 25th.—Macedon. Object: Autumn Foliage. Leader: Mr. E. E. Pescott, F.L.S. Meet at Spencer Street station in time for 6.40 a.m. train. Bring provisions for two meals. Members intending to take part in this excursion are requested to hand their names to the Leader or the Hon. Secretary at the April meeting.

SATURDAY, MAY 7th.—Agricultural School. Object: Agricultural Zoology. Leader: Miss J. Raff, M.Sc., F.E.S. Meet at Conservatorium Gate, University, at 2.30 p.m.

NOTE.—A list of members is to be published in the May *Naturalist*. The Committee finds that the subscriptions of a number of members are in arrears, and in order to ensure inclusion of their names in the list, it will be necessary for such members to at once remit their subscriptions.

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